

**KTL Test Report:** 9L0766RUS2

**Applicant:** Proxim Inc.  
401 Edgewater Drive, Suite 530  
Wakefield, MA 01880

**Equipment Under Test:** Stratum MP

**FCC ID:** IMK-STMP-10-1

**In Accordance With:** FCC Part 15, Subpart C, 15.247  
Direct Sequence Spread Spectrum Transmitters

**Tested By:**  
  
KTL Dallas Inc.  
802 N. Kealy  
Lewisville, Texas 75057-3136

**Authorized By:**



Tom Tidwell, RF Group Manager

**Date:** May 31, 2000

**Total Number of Pages:** 50

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**Section 1. Summary of Test Results**Manufacturer: [Proxim](#)Model No.: [Stratum MP](#)Serial No.: [Sample No. 10](#)General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C, Paragraph 15.247 for Direct Sequence Spread Spectrum devices. Radiated tests were conducted in accordance with ANSI C63.4-1992. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See " Summary of Test Data".



**NVLAP LAB CODE: 100426-0**

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EQUIPMENT: [Stratum MP](#)PROJECT NO.: [9L0766RUS2](#)**Summary Of Test Data**

| NAME OF TEST                           | PARA. NO.    | SPEC.            | MEAS.                                     | RESULT                   |
|----------------------------------------|--------------|------------------|-------------------------------------------|--------------------------|
| Powerline Conducted Emissions          | 15.207(a)    | 48 dB $\mu$ V    | <a href="#">47.75 dBuV Peak</a>           | <a href="#">Complies</a> |
| Minimum 6 dB Bandwidth                 | 15.247(a)(2) | 500 kHz          | <a href="#">19 MHz</a>                    | <a href="#">Complies</a> |
| Maximum Peak Power Output              | 15.247(b)(1) | 1 Watt @ antenna | <a href="#">14.5 mW<br/>(1.83 W EIRP)</a> | <a href="#">Complies</a> |
| Spurious Emissions (Antenna Conducted) | 15.247(c)    | -20 dBc/100kHz   | <a href="#">-40 dBc</a>                   | <a href="#">Complies</a> |
| Spurious Emissions (Restricted Bands)  | 15.247(c)    | Table 15.209(a)  | <a href="#">45 dBuV/m (Peak)</a>          | <a href="#">Complies</a> |
| Peak Power Spectral Density            | 15.247(d)    | +8 dBm/3kHz      | <a href="#">-10 dBm</a>                   | <a href="#">Complies</a> |
| Processing Gain                        | 15.247(e)    | 10 dB            | <a href="#">&gt; 10 dB</a>                | <a href="#">Complies</a> |

Footnotes: [None](#)

## **Section 2. Equipment Under Test (E.U.T.)**

### **General Equipment Information**

**Frequency Band:**

- ☐ 902 – 928 MHz  
☒ 2400 – 2483.5 MHz  
☐ 5725 – 5850 MHz

**Channel Spacing:**

2417MHz - 2457MHz

**Emissions Designator:**

24M0G7W

**User Frequency Adjustment:**

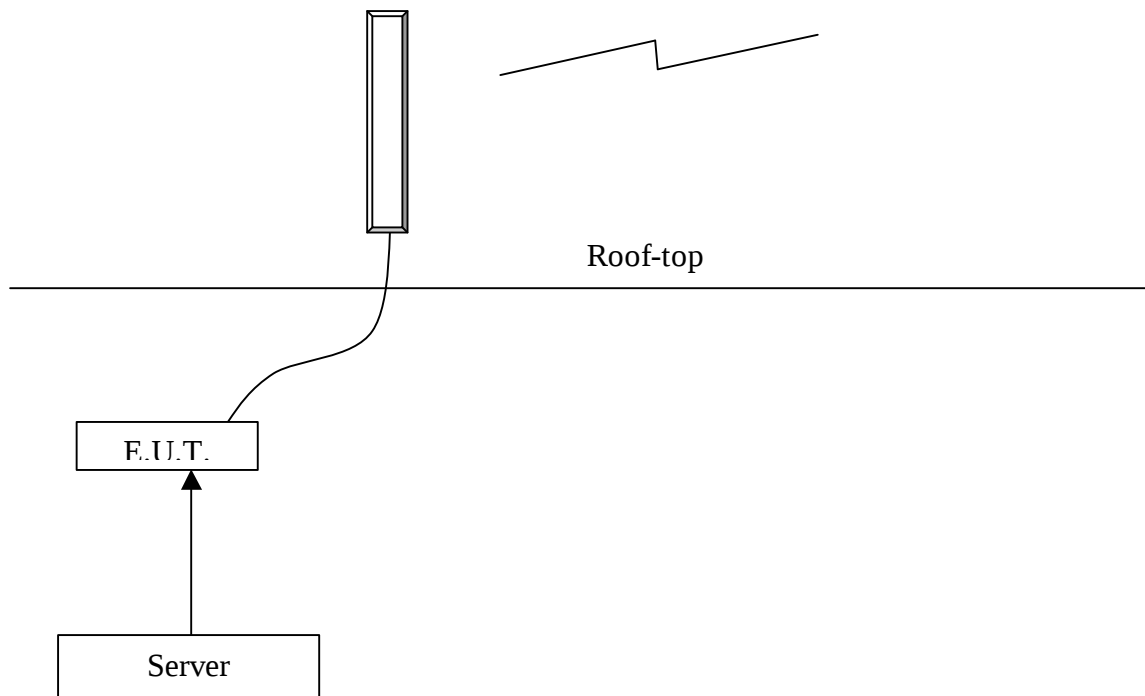
Software controlled

## Description of Operation

The E.U.T. is a wireless ethernet bridge. The following antenna configurations are possible:

|                                                     |                         |                                                    |
|-----------------------------------------------------|-------------------------|----------------------------------------------------|
| <a href="#">Dipole antenna</a>                      | <a href="#">0 dBi</a>   | <a href="#">Mounted directly to rf output port</a> |
| <a href="#">Omni-directional antenna (monopole)</a> | <a href="#">5.1 dBi</a> | <a href="#">Roof-top mount</a>                     |
| <a href="#">Omni-directional antenna (monopole)</a> | <a href="#">9 dBi</a>   | <a href="#">Roof-top mount</a>                     |
| <a href="#">Flat panel antenna</a>                  | <a href="#">8.5 dBi</a> | <a href="#">Roof-top mount</a>                     |
| <a href="#">Flat panel antenna</a>                  | <a href="#">12 dBi</a>  | <a href="#">Roof-top mount</a>                     |
| <a href="#">Dish antenna (parabolic)</a>            | <a href="#">21 dBi</a>  | <a href="#">Roof-top mount</a>                     |

## System Diagram



*EQUIPMENT:* [Stratum MP](#)PROJECT NO.: [9L0766RUS2](#)

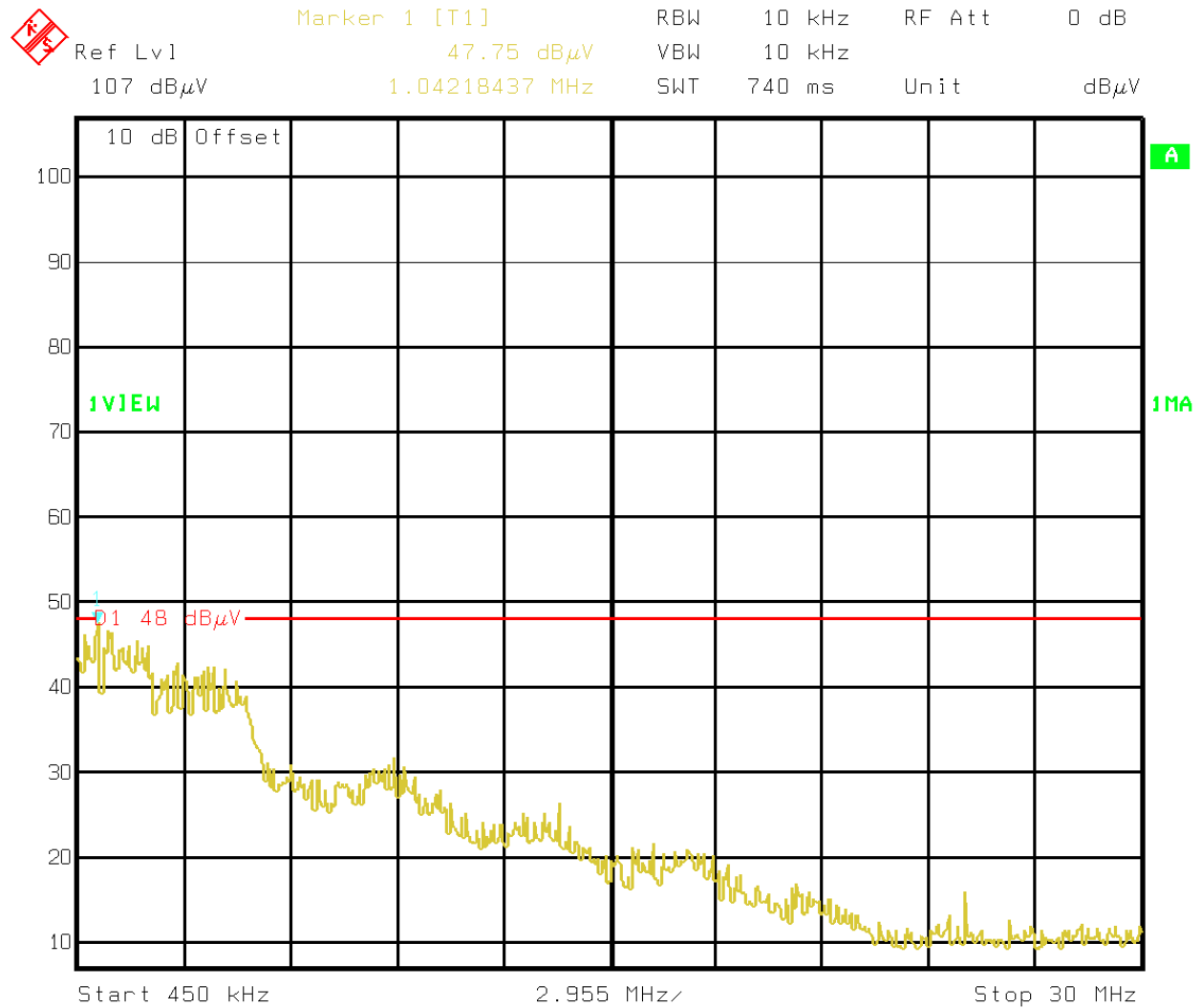
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**Section 3. Powerline Conducted Emissions**

|                                             |                      |
|---------------------------------------------|----------------------|
| NAME OF TEST: Powerline Conducted Emissions | PARA. NO.: 15.207(a) |
| TESTED BY: Kevin Rose                       | DATE: May 15 2000    |

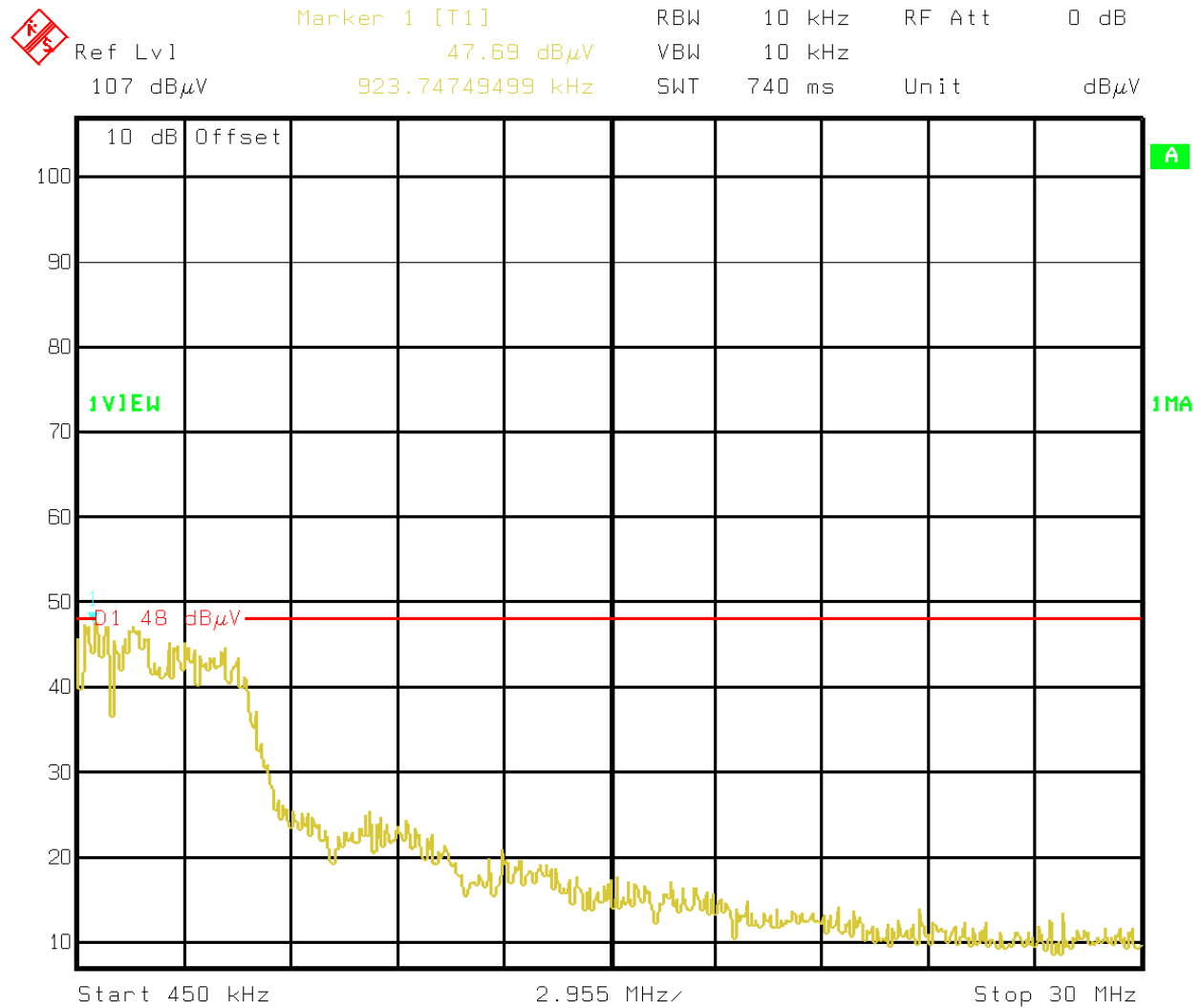
**Test Results:** [Complies.](#)**Measurement Data:** See attached plots.**Equipment Used:** [1036, 1043, 1188](#)**Temperature:** [20](#) °C**Relative Humidity:** [43](#) %

## Powerline Conducted Emissions Plots



Title: fcc neutral  
Comment A: fcc neutral  
Date: 16.MAY.2000 9:12:37

## Powerline Conducted Emissions Plots

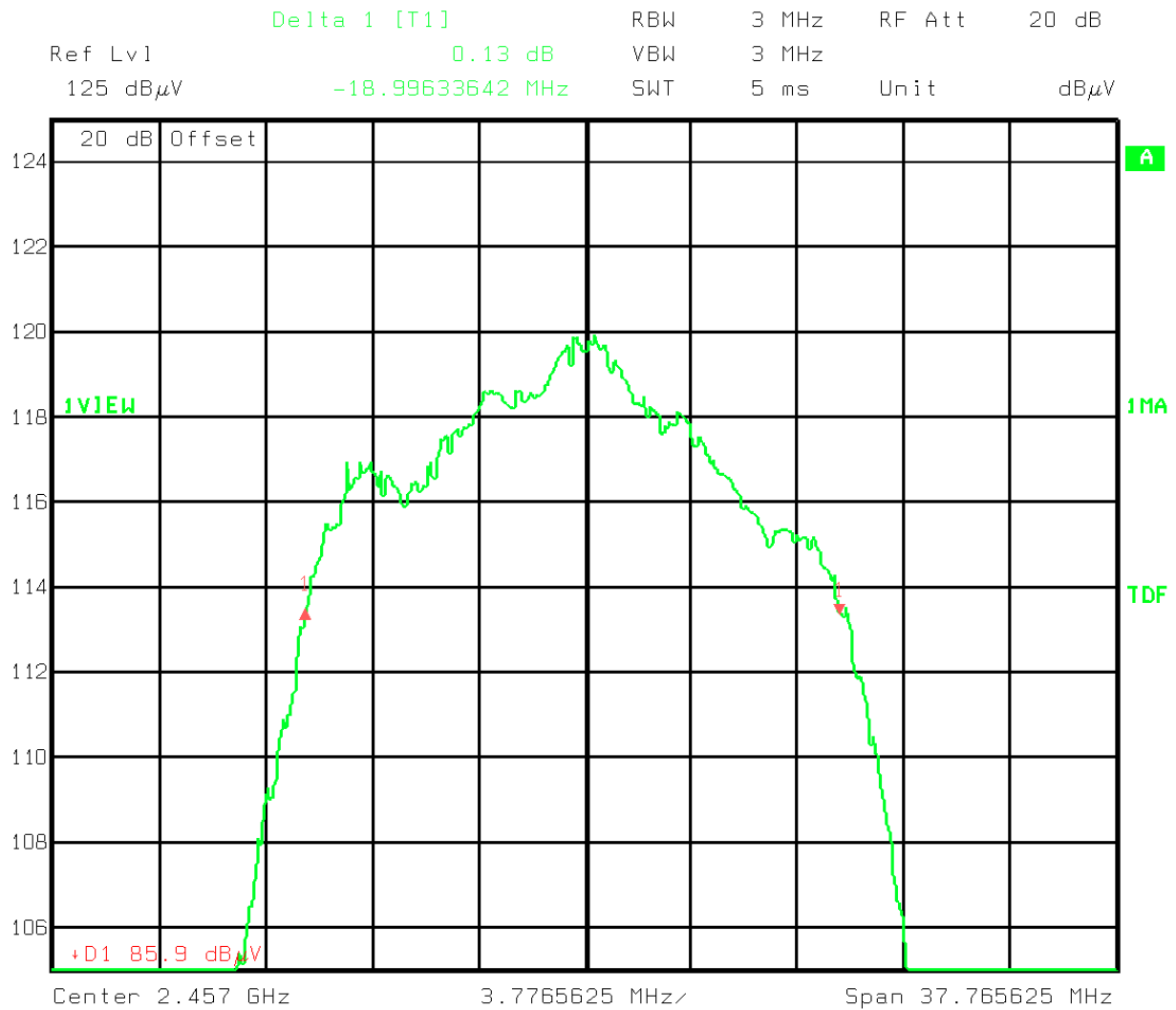


Title: fcc phase  
Comment A: fcc phase  
Date: 16.MAY.2000 9:10:39

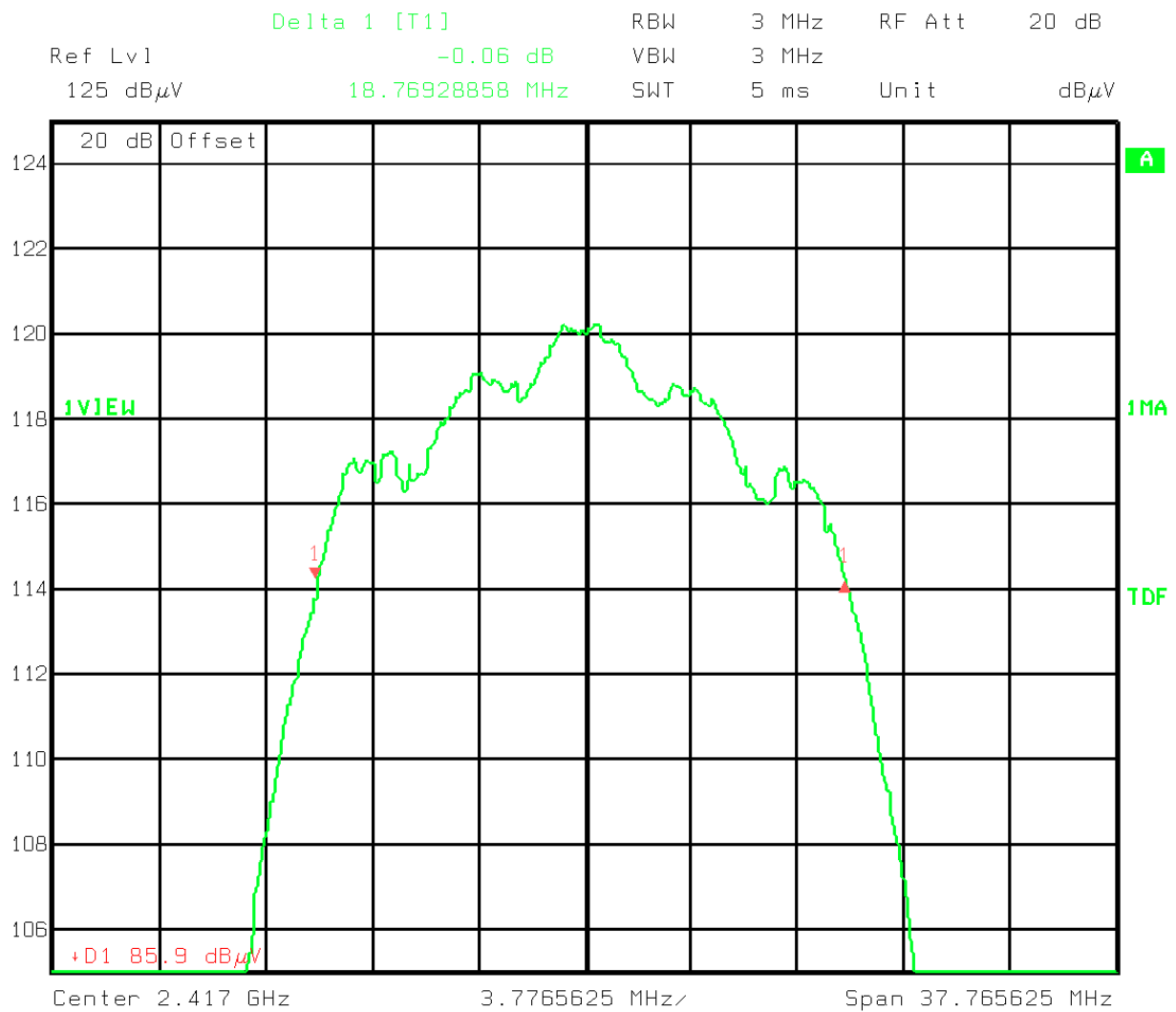
EQUIPMENT: [Stratum MP](#)PROJECT NO.: [9L0766RUS2](#)**Section 4. Minimum 6 dB Bandwidth**

|                                      |                         |
|--------------------------------------|-------------------------|
| NAME OF TEST: Minimum 6 dB Bandwidth | PARA. NO.: 15.247(a)(2) |
| TESTED BY: Kevin Rose                | DATE: 5/11/00           |

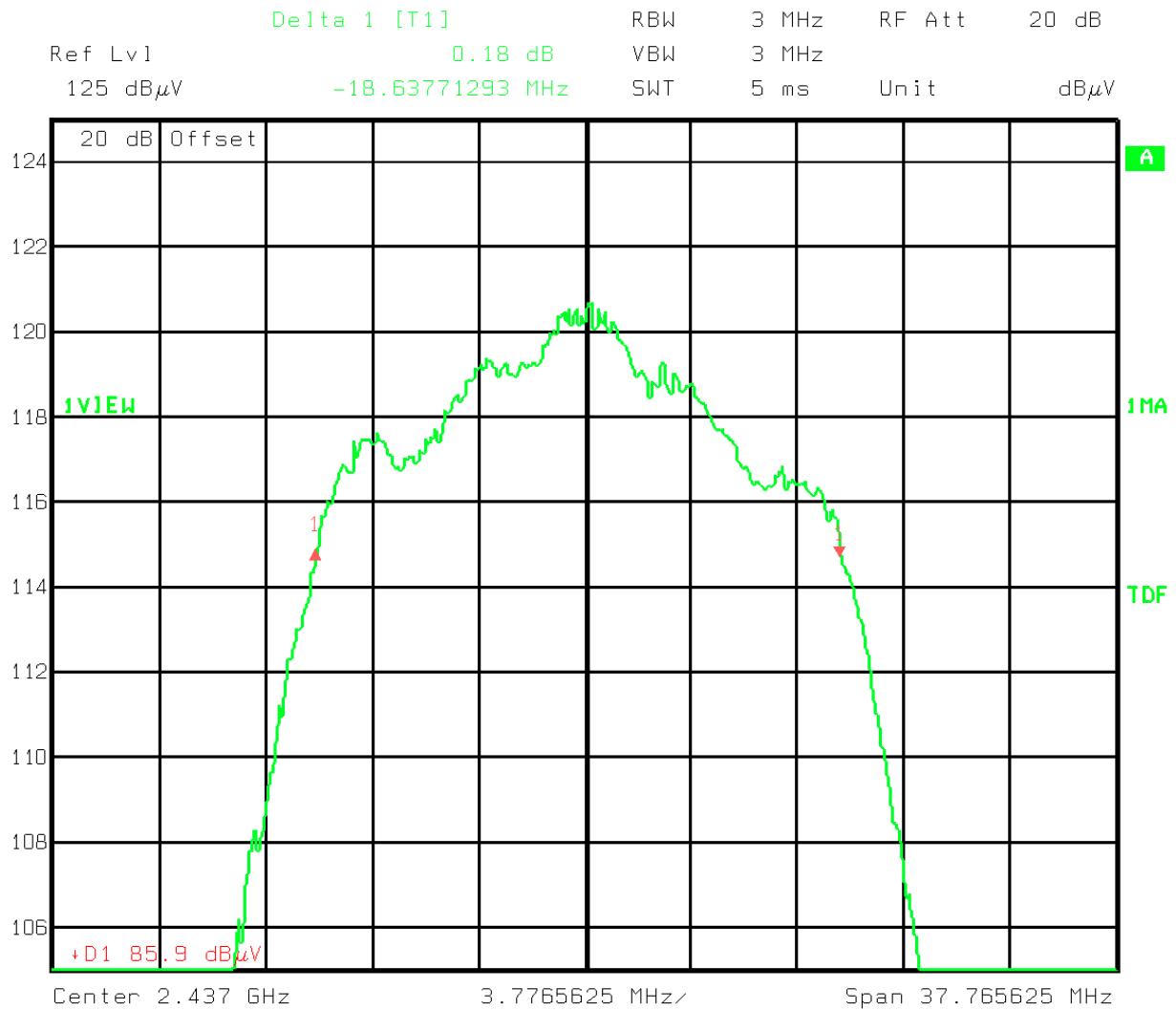
**Test Results:** Complies.**Measurement Data:** See 6 dB BW plot  
Measured 6 dB bandwidth: [19 MHz](#)**Equipment Used:** [1036, 1043](#)**Temperature:** [21](#) °C**Relative Humidity:** [42](#) %

**6db bandwidth**

Title: 6db high  
Comment A: proxim  
Date: 11.MAY.2000 14:03:27

EQUIPMENT: [Stratum MP](#)PROJECT NO.: [9L0766RUS2](#)**6db bandwidth**

Title: 6db lower bw  
Comment A: proxim  
Date: 11.MAY.2000 13:58:19

**6db bandwidth**

Title: 6db mid  
Comment A: proxim  
Date: 11.MAY.2000 14:01:20

EQUIPMENT: Stratum MPPROJECT NO.: 9L0766RUS2**Section 5. Maximum Peak Output Power**

NAME OF TEST: Maximum Peak Output power

PARA. NO.: 15.247(b)(1)

TESTED BY: Kevin Rose

DATE: 5/23/00

**RF Power Output (Conducted)**

Job No.: 9L0766R

Date: 5/11/00

Specification: CFR 47, Part 15

Temperature(°F): 72Tested By: Kevin RoseRelative Humidity(%) 50E.U.T.: Wireless BridgeConfiguration: Main RF PortSample Number: 10RBW: #N/ADetector: PeakVBW: #N/A**Test Equipment Used**Power Meter: 406Directional Coupler: #N/APower Sensor: 1021Cable #1: 1043Load: #N/ACable #2: #N/ASpectrum Analyzer: #N/ACable #3: #N/AAttenuator #1: 1065Cable #4: #N/AAttenuator #2: #N/ACable #5: #N/AAttenuator #3: #N/ACable #6: #N/AAttenuator #4: #N/A

Additional equipment used: \_\_\_\_\_

Measurement Uncertainty: +/- .7 dB

| Antenna Model and Type | Measured Power(watts) |                |                 | Antenna Gain (dBi) | EIRP (watts)   |                |                 |
|------------------------|-----------------------|----------------|-----------------|--------------------|----------------|----------------|-----------------|
|                        | RF Channel Low        | RF Channel Mid | RF Channel High |                    | RF Channel Low | RF Channel Mid | RF Channel High |
| Dipole                 | 0.0145                | 0.0145         | 0.0141          | 0                  | 0.01450        | 0.01450        | 0.01410         |
| S2403B Omni            | 0.0145                | 0.0145         | 0.0141          | 5.1                | 0.04692        | 0.04692        | 0.04563         |
| 7014-05 Omni           | 0.0145                | 0.0145         | 0.0141          | 9                  | 0.11518        | 0.11518        | 0.11200         |
| 1900.0043 Flat Panel   | 0.0145                | 0.0145         | 0.0141          | 8.5                | 0.10265        | 0.10265        | 0.09982         |
| 505026AX Flat Panel    | 0.0145                | 0.0145         | 0.0141          | 12                 | 0.22981        | 0.22981        | 0.22347         |
| PT2421 Dish            | 0.0145                | 0.0145         | 0.0141          | 21                 | 1.82544        | 1.82544        | 1.77508         |

EIRP is derived from the relation:  $10 \left[ (10 \log(P) + G) / 10 \right]$ 

where: P = Power at antenna terminal(W) and G = EUT antenna gain(dBi)

**Section 6. RF Exposure**

NAME OF TEST: RF Exposure

PARA. NO.: 15.247(b)(4)

The E.U.T. operates with a variety of roof-mount antennas as described in the description of operation. The only antenna that is not roof-mount is the 0 dBi dipole “rubber ducky” antenna. The maximum measured peak output power in this configuration is 14.5 mW e.i.r.p. This is well below the levels expected to present an rf exposure risk.

The roof-top antennas are professionally installed and have unique connectors (reverse TNC).

EQUIPMENT: [Stratum MP](#)PROJECT NO.: [9L0766RUS2](#)

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**Section 7. Spurious Emissions (conducted)**

|                                              |                      |
|----------------------------------------------|----------------------|
| NAME OF TEST: Spurious Emissions (conducted) | PARA. NO.: 15.247(c) |
| TESTED BY: Kevin Rose                        | DATE: 5/11/00        |

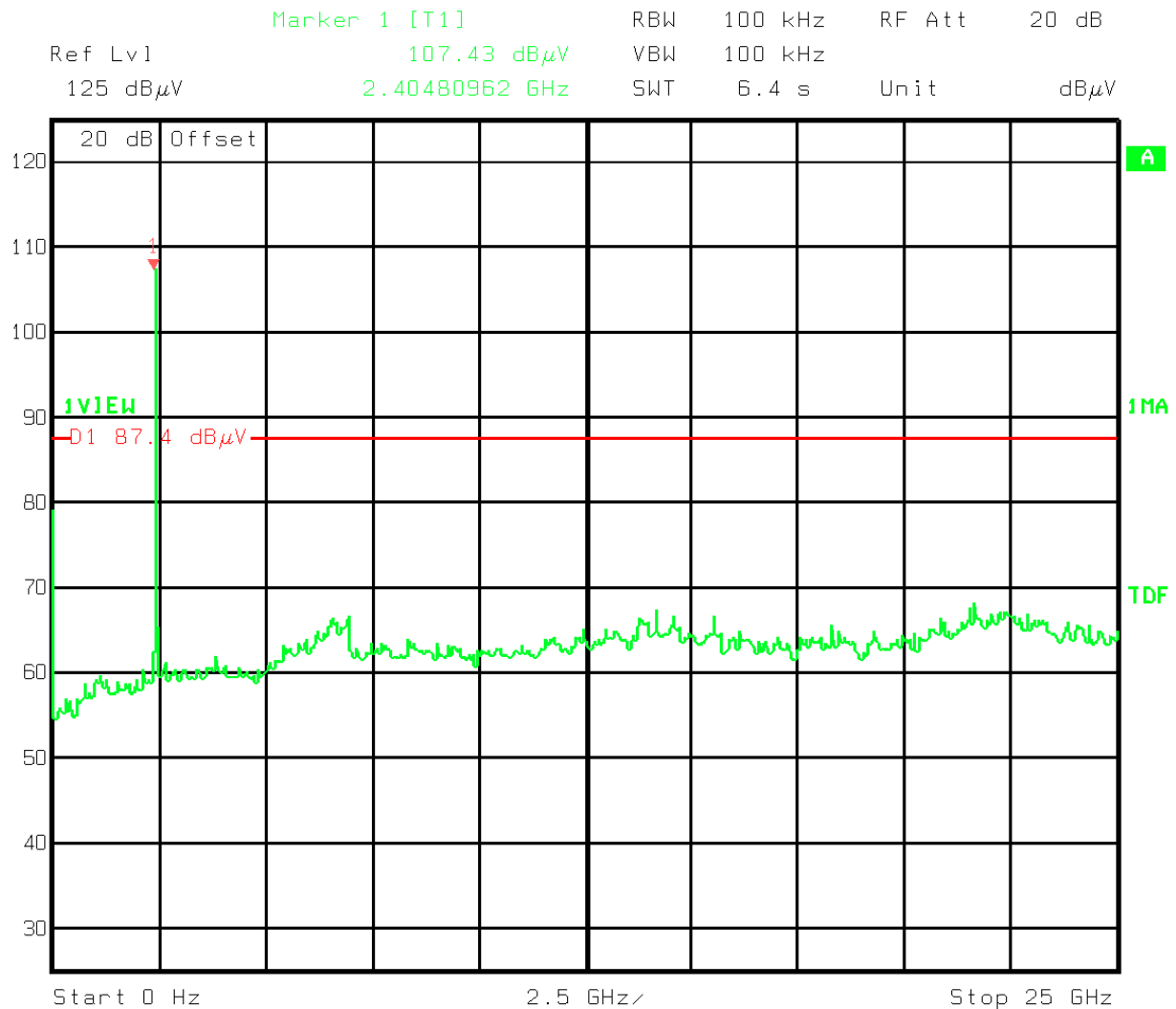
**Test Results:** [Complies. The worst-case spurious emission is more than 40 dB below the peak carrier level.](#)

**Measurement Data:** See attached plots.

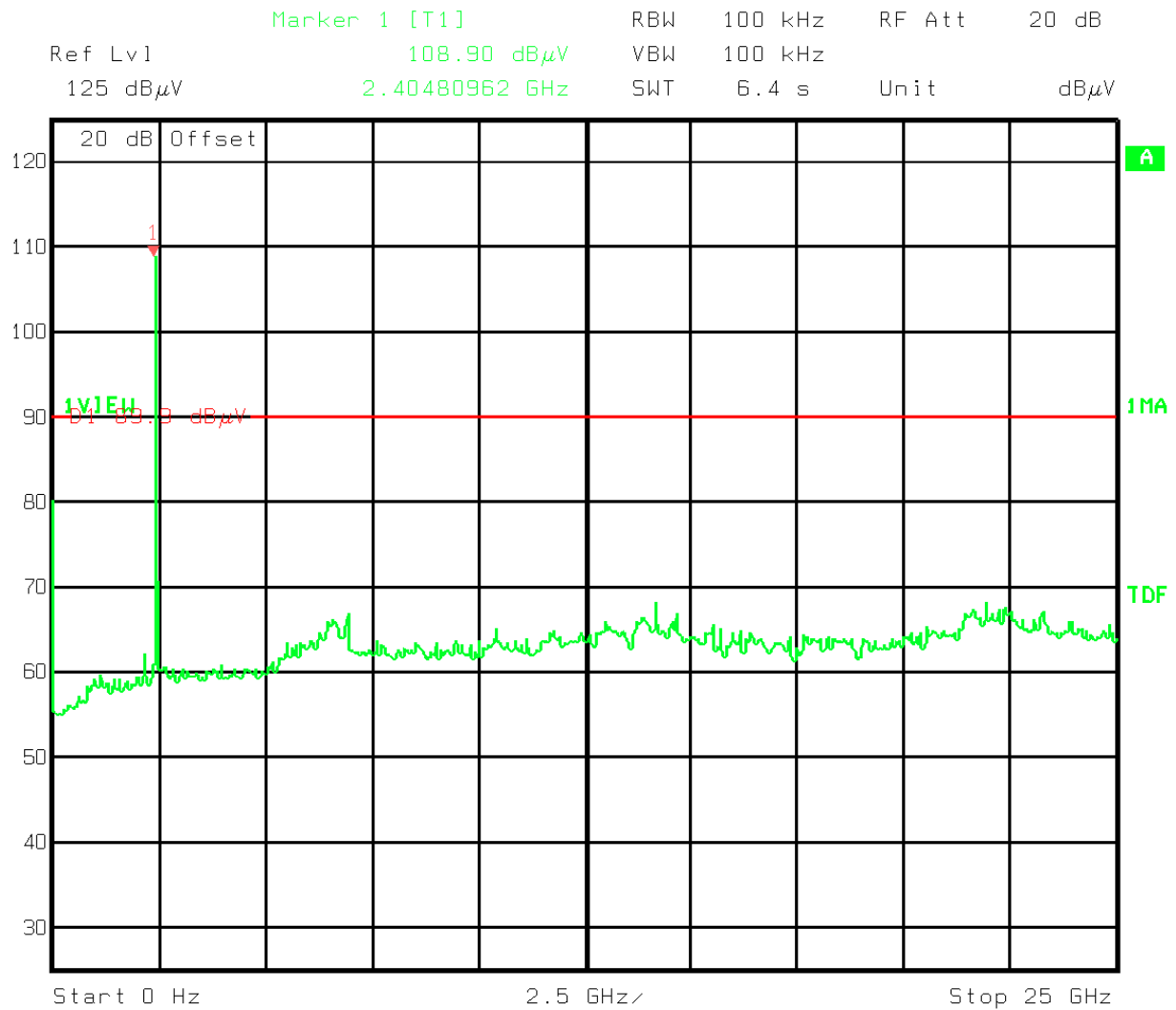
**Equipment Used:** [1036, 1043](#)

**Temperature:** [21](#) °C

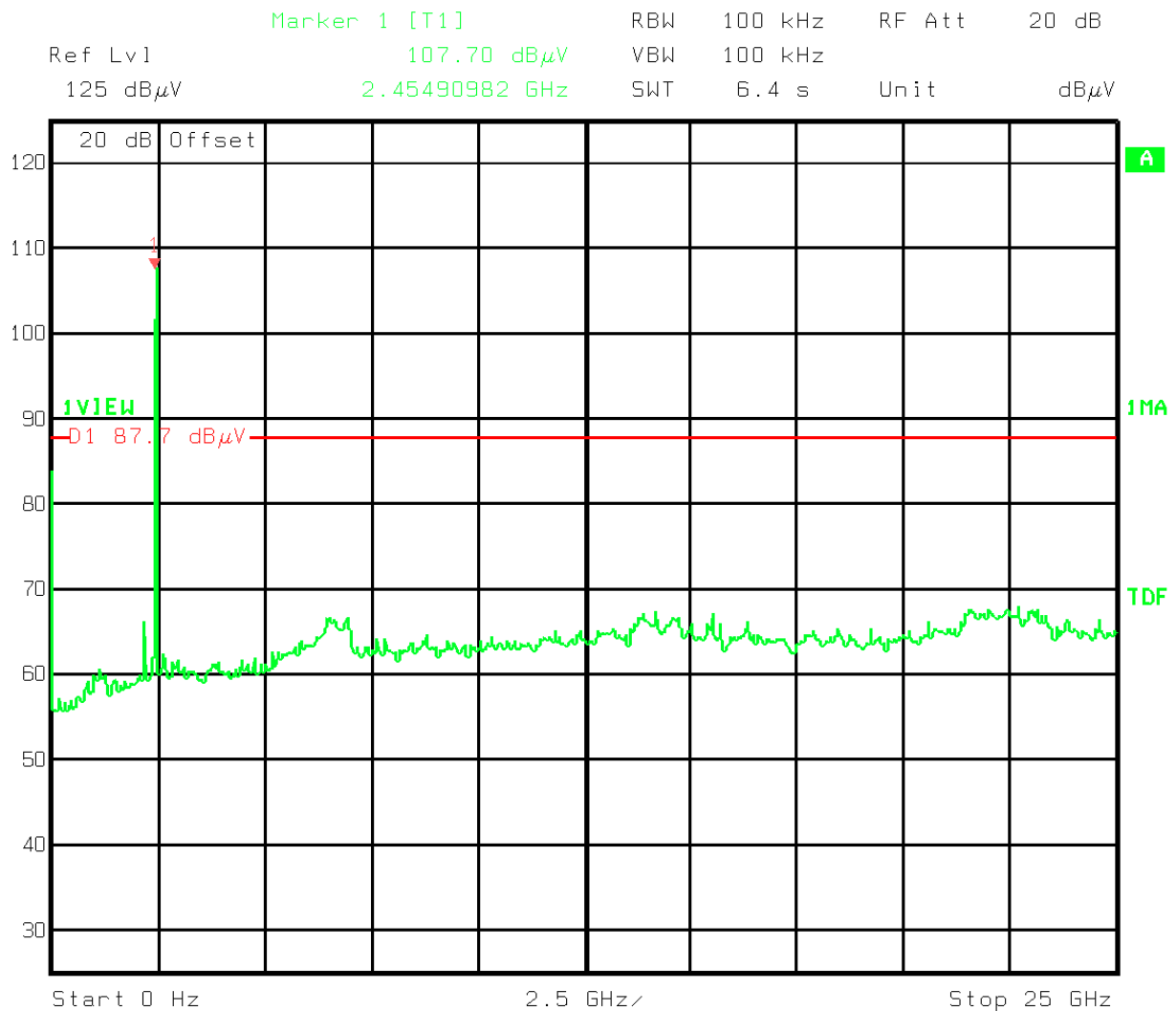
**Relative Humidity:** [43](#) %

EQUIPMENT: **Stratum MP**PROJECT NO.: **9L0766RUS2**

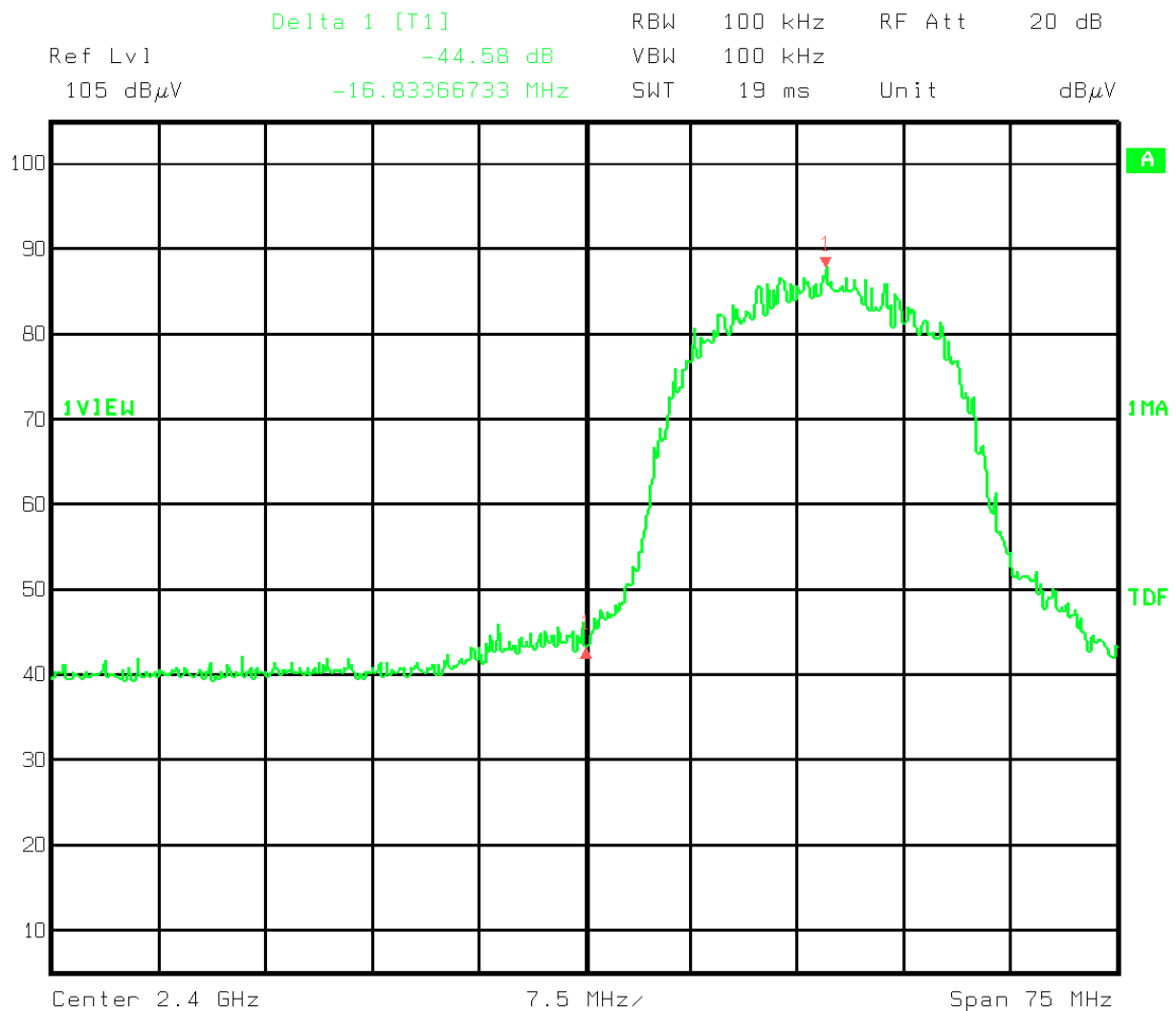
Title: tx spurious low aux  
Comment A: proxim  
Date: 11.MAY.2000 14:14:00

EQUIPMENT: **Stratum MP**PROJECT NO.: **9L0766RUS2**

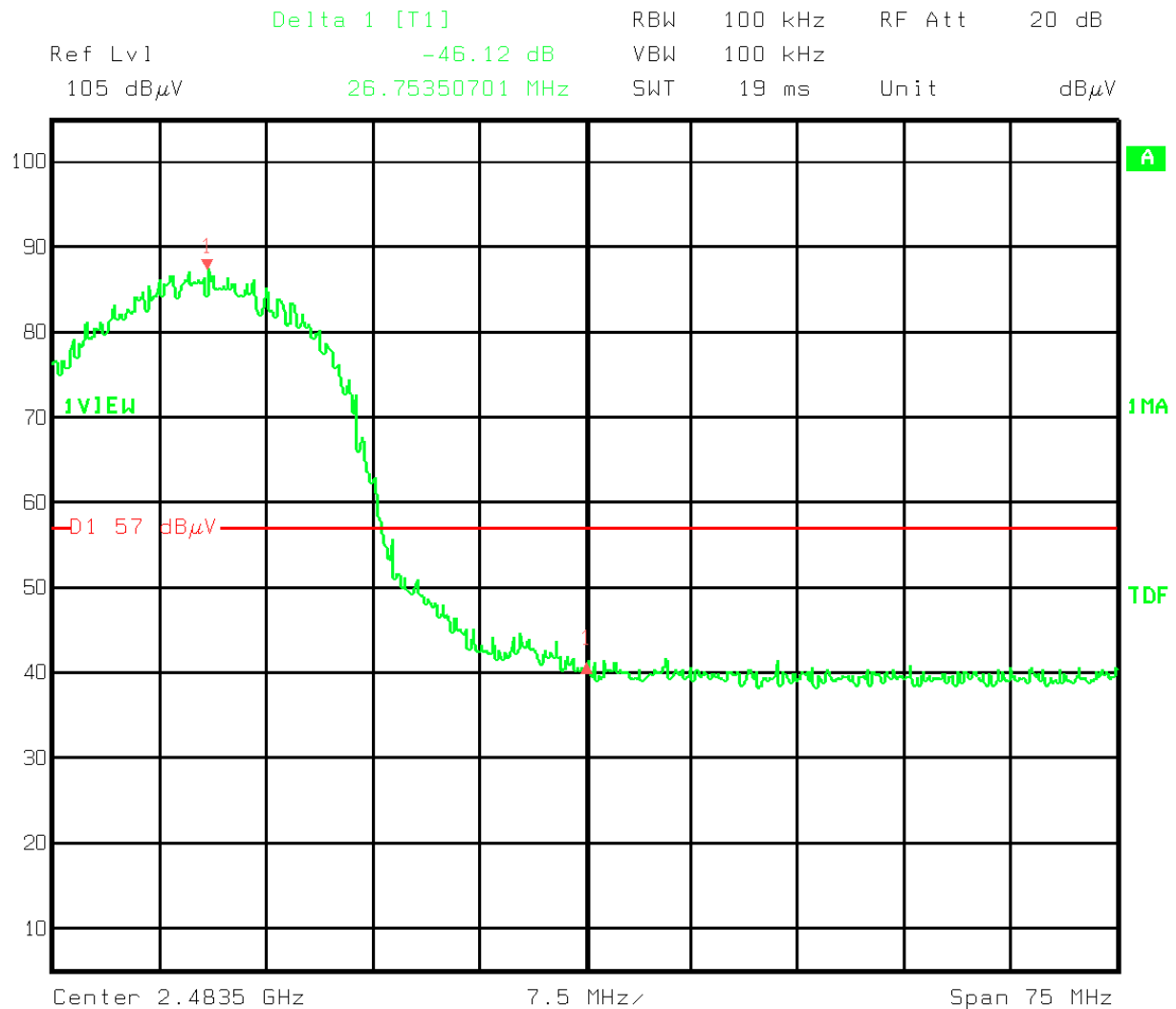
Title: tx spurious mid aux  
Comment A: proxim  
Date: 11.MAY.2000 14:12:15

EQUIPMENT: [Stratum MP](#)PROJECT NO.: [9L0766RUS2](#)

Title: tx spurious upper aux  
Comment A: proxim  
Date: 11.MAY.2000 14:16:23

EQUIPMENT: **Stratum MP**PROJECT NO.: **9L0766RUS2**

Title: lower band edge  
Comment A: proxim  
Date: 11.MAY.2000 14:39:41

EQUIPMENT: **Stratum MP**PROJECT NO.: **9L0766RUS2**

Title: upper band edge  
Comment A: proxim  
Date: 11.MAY.2000 14:35:08

**Section 8. Spurious Emissions (radiated)**

|                                 |                       |
|---------------------------------|-----------------------|
| NAME OF TEST: Peak Power Output | PARA. NO.: 15.247 (c) |
| TESTED BY: Kevin Rose           | DATE: 5/15/00         |

**Test Results:** Complies.

**Measurement Data:** See attached table.

**Duty Cycle Calculation:**

Duty Cycle correction factor(dB) =  $20 \log (rf_{ON} \text{ in ms}/100\text{ms})$

6 pulses in 10 ms.

60 pulses in 100 ms

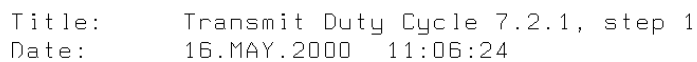
1.304 ms on time pulses

.363 ms off time pulses

78.24 ms on time over 100ms=.78.24 log 20= -2.1 db correction factor

**Temperature:** 21 °C

**Relative Humidity:** 43 %



EQUIPMENT: Stratum MPPROJECT NO.: 9L0766RUS2**Spurious Emissions (Radiated)**

| Radiated Emissions<br>FCC                                             |          |                              |  |                                           |  |                                |  |
|-----------------------------------------------------------------------|----------|------------------------------|--|-------------------------------------------|--|--------------------------------|--|
| Complete                                                              | <u>X</u> |                              |  |                                           |  |                                |  |
| Preliminary                                                           |          |                              |  |                                           |  |                                |  |
|                                                                       |          | Page <u>1</u> of <u>1</u>    |  |                                           |  |                                |  |
| Client: <u>Proxim</u>                                                 |          | W.O.#: <u>9L0766R</u>        |  | Date: <u>May 12 2000</u>                  |  |                                |  |
| EUT: <u>Stratum MP</u>                                                |          | Sample# <u>10</u>            |  | Specification: <u>CFR47, Part 15.247</u>  |  |                                |  |
| Tech: <u>Kevin rose</u>                                               |          | Test #: <u>APSE-1</u>        |  | Lab: <u>AC3</u>                           |  | Photo ID: <u>9L0766 APSE-1</u> |  |
| Equipment Used: <u>CF47 CF44 CF41 CF43 G2016 G2200</u>                |          |                              |  | Antenna Distance: <u>3m</u>               |  |                                |  |
| Configuration: <u>Transmitting into 12 dB Gain Flat Panel Antenna</u> |          |                              |  |                                           |  |                                |  |
| IF Bandwidth: <u>1Mhz</u>                                             |          | Video Bandwidth: <u>1Mhz</u> |  | Detector: <u>Peak</u> <u>X</u> Quasi Peak |  |                                |  |
| Ambient Temperature: <u>21</u> C                                      |          | EUT Power: <u>X</u>          |  | 115 V.A.C. <u>X</u>                       |  | 60 Hz <u>X</u> 1 Phase         |  |
| Relative Humidity: <u>54</u> %                                        |          |                              |  | 230 V.A.C. <u>50</u> Hz                   |  | <u>3</u> Phase                 |  |
| Atmospheric Pressure: <u>999</u> mbar                                 |          |                              |  | Other <u></u>                             |  |                                |  |

| Freq.<br>(MHz) | Meter<br>Reading<br>(dBuV) | Antenna<br>Factor<br>(dB) | Cable<br>Loss<br>(dB) | RF<br>Gain<br>(dB) | Corrected<br>Reading<br>(dBuV) | Spec.limit<br>(dBuV)<br>FCC | Pol. | Comments:    |
|----------------|----------------------------|---------------------------|-----------------------|--------------------|--------------------------------|-----------------------------|------|--------------|
| 2.4172         |                            |                           |                       |                    |                                |                             |      | Fundamental  |
| 4.8344         | 48                         | 30                        | 7                     | 30                 | 43                             | 54                          | V    | Low Chanel   |
| 7.2516         | 45.3                       | 34.2                      | 8.6                   | 34.2               | 41.9                           | 54                          | V    | Low Chanel   |
| 9.6688         | 46.3                       | 33.9                      | 11.5                  | 33.2               | 46.5                           | 54                          | V    | Low Chanel   |
| 12.0853        | 45.8                       | 33                        | 12.5                  | 33.5               | 45.8                           | 54                          | V    | Low Chanel   |
| 2.4172         |                            |                           |                       |                    |                                |                             |      | Fundamental  |
| 4.8344         | 45.2                       | 30                        | 7                     | 30                 | 40.2                           | 54                          | H    | Low Chanel   |
| 7.2516         | 44.3                       | 34.2                      | 8.6                   | 34.2               | 40.9                           | 54                          | H    | Low Chanel   |
| 9.6688         | 46.5                       | 33.9                      | 11.5                  | 33.2               | 46.7                           | 54                          | H    | Low Chanel   |
| 12.0853        | 45.2                       | 33                        | 12.5                  | 33.5               | 45.2                           | 54                          | H    | Low Chanel   |
| 2.436          |                            |                           |                       |                    |                                |                             |      | Fundamental  |
| 4.873          | 45.6                       | 30                        | 7                     | 30                 | 40.6                           | 54                          | H    | Mid Channel  |
| 7.3095         | 44.7                       | 34.2                      | 8.6                   | 34.2               | 41.3                           | 54                          | H    | Mid Channel  |
| 9.746          | 45.3                       | 33.9                      | 11.5                  | 33.2               | 45.5                           | 54                          | H    | Mid Channel  |
| 12.182         | 45.2                       | 33                        | 12.5                  | 33.5               | 45.2                           | 54                          | H    | Mid Channel  |
| 2.436          |                            |                           |                       |                    |                                |                             |      | Fundamental  |
| 4.873          | 45.7                       | 30                        | 7                     | 30                 | 40.7                           | 54                          | V    | Mid Channel  |
| 7.3095         | 44.5                       | 34.2                      | 8.6                   | 34.2               | 41.1                           | 54                          | V    | Mid Channel  |
| 9.746          | 45.5                       | 33.9                      | 11.5                  | 33.2               | 45.7                           | 54                          | V    | Mid Channel  |
| 12.182         | 46.2                       | 33                        | 12.5                  | 33.5               | 46.2                           | 54                          | V    | Mid Channel  |
| 2.4565         |                            |                           |                       |                    |                                |                             |      | Fundamental  |
| 4.913          | 45.3                       | 30                        | 7                     | 30                 | 40.3                           | 54                          | V    | High Channel |
| 7.3695         | 46                         | 34.2                      | 8.6                   | 34.2               | 42.6                           | 54                          | V    | High Channel |
| 9.826          | 46.3                       | 33.9                      | 11.5                  | 33.2               | 46.5                           | 54                          | V    | High Channel |
| 12.2825        | 45.8                       | 33                        | 12.5                  | 33.5               | 45.8                           | 54                          | V    | High Channel |
| 2.4565         |                            |                           |                       |                    |                                |                             |      | Fundamental  |
| 4.913          | 44.7                       | 30                        | 7                     | 30                 | 39.7                           | 54                          | H    | High Channel |
| 7.3695         | 45.3                       | 34.2                      | 8.6                   | 34.2               | 41.9                           | 54                          | H    | High Channel |
| 9.826          | 46.3                       | 33.9                      | 11.5                  | 33.2               | 46.5                           | 54                          | H    | High Channel |
| 12.2825        | 44.8                       | 33                        | 12.5                  | 33.5               | 44.8                           | 54                          | H    | High Channel |

EQUIPMENT: Stratum MPPROJECT NO.: 9L0766RUS2**Spurious Emissions (Radiated)**

| Radiated Emissions                                                            |                            |                                |                       |                                                    |                                |                                |      |                           |
|-------------------------------------------------------------------------------|----------------------------|--------------------------------|-----------------------|----------------------------------------------------|--------------------------------|--------------------------------|------|---------------------------|
| FCC                                                                           |                            |                                |                       |                                                    |                                |                                |      |                           |
| Complete                                                                      | <u>X</u>                   |                                |                       |                                                    |                                |                                |      |                           |
| Preliminary                                                                   | <u>        </u>            | Page <u>1</u> of <u>1</u>      |                       |                                                    |                                |                                |      |                           |
| Client: <u>Proxim</u>                                                         |                            | W.O.#: <u>9L0766R</u>          |                       | Date: <u>5/12/00</u>                               |                                |                                |      |                           |
| EUT: <u>Stratum MP</u>                                                        |                            | Sample# <u>10</u>              |                       | Specification: <u>CFR47, Part 15.247</u>           |                                |                                |      |                           |
| Tech: <u>Kevin Rose</u>                                                       |                            | Test #: <u>APSE-2</u>          |                       | Lab: <u>AC3</u>                                    |                                | Photo ID: <u>9L0766 APSE-2</u> |      |                           |
| Equipment Used: <u>CF47 CF44 CF41 CF43 G2016 G2200</u>                        |                            |                                |                       | Antenna Distance: <u>3m</u>                        |                                |                                |      |                           |
| CoNfiguration: <u>Transmitting @ Mid Channel into 21 dB Gain Dish Antenna</u> |                            |                                |                       |                                                    |                                |                                |      |                           |
| IF Bandwidth: <u>1Mhz</u>                                                     |                            | Video Bandwidth <u>1Mhz</u>    |                       | Detector: <u>X</u> Peak <u>        </u> Quasi Peak |                                |                                |      |                           |
| Ambient Temperature: <u>21</u> C                                              |                            | EUT Power: <u>X</u> 115 V.A.C. |                       | <u>X</u> 60 Hz                                     |                                | <u>X</u> 1 Phase               |      |                           |
| Relative Humidity: <u>54</u> %                                                |                            | <u>        </u> 230 V.A.C.     |                       | <u>        </u> 50 Hz                              |                                | <u>        </u> 3 Phase        |      |                           |
| Atmospheric Pressure: <u>999</u> mbar                                         |                            | Other <u>        </u>          |                       |                                                    |                                |                                |      |                           |
| Freq.<br>(MHz)                                                                | Meter<br>Reading<br>(dBuV) | Antenna<br>Factor<br>(dB)      | Cable<br>Loss<br>(dB) | RF<br>Gain<br>(dB)                                 | Corrected<br>Reading<br>(dBuV) | Spec.limit<br>(dBuV)<br>FCC    | Pol. | Comments:                 |
| 2.4357                                                                        |                            |                                |                       |                                                    |                                |                                |      | Fundamental               |
| 4.8714                                                                        | 47.2                       | 30                             | 7                     | 30                                                 | 42.2                           | 54                             | H    | NF                        |
| 7.3071                                                                        | 45.5                       | 34.2                           | 8.6                   | 34.2                                               | 42.1                           | 54                             | H    | NF                        |
| 9.7428                                                                        | 46.5                       | 33.9                           | 11.5                  | 33.2                                               | 46.7                           | 54                             | H    | NF                        |
| 12.18                                                                         | 46.5                       | 33                             | 12.5                  | 33.5                                               | 46.5                           | 54                             | H    | NF                        |
|                                                                               |                            |                                |                       |                                                    |                                |                                |      |                           |
| 2.4357                                                                        |                            |                                |                       |                                                    |                                |                                |      | Fundamental               |
| 4.8664                                                                        | 48                         | 30                             | 7                     | 30                                                 | 55                             | 54                             | V    |                           |
| 4.865                                                                         | 35.8                       | 30                             | 7                     | 30                                                 | 42.8                           | 54                             | V    | Video BW dropped to 10 Hz |
| 7.307                                                                         | 45.2                       | 34.2                           | 8.6                   | 34.2                                               | 41.8                           | 54                             | V    | NF                        |
| 9.7211                                                                        | 45.5                       | 33.9                           | 11.5                  | 33.2                                               | 45.7                           | 54                             | V    | NF                        |
| 12.1568                                                                       | 46.3                       | 33                             | 12.5                  | 33.5                                               | 46.3                           | 54                             | V    | NF                        |
|                                                                               |                            |                                |                       |                                                    |                                |                                |      |                           |
|                                                                               |                            |                                |                       |                                                    |                                |                                |      |                           |

EQUIPMENT: Stratum MPPROJECT NO.: 9L0766RUS2**Spurious Emissions (Radiated)**

| Radiated Emissions<br>FCC                                             |                            |                                                 |                       |                                            |                                |                                |      |             |               |
|-----------------------------------------------------------------------|----------------------------|-------------------------------------------------|-----------------------|--------------------------------------------|--------------------------------|--------------------------------|------|-------------|---------------|
| Complete <u>X</u><br>Preliminary <u>      </u>                        |                            | Page <u>1</u> of <u>1</u>                       |                       |                                            |                                |                                |      |             |               |
| Client: <u>Proxim</u>                                                 |                            | W.O.#: <u>9L0766R</u>                           |                       | Date: <u>may 12 2000</u>                   |                                |                                |      |             |               |
| EUT: <u>Stratum MP</u>                                                |                            | Sample# <u>10</u>                               |                       | Specification: <u>                    </u> |                                |                                |      |             |               |
| Tech: <u>Kevin Rose</u>                                               |                            | Test #: <u>APSE-3</u>                           |                       | Lab: <u>AC3</u>                            |                                | Photo ID: <u>9L0766FAPSE-3</u> |      |             |               |
| Equipment Used: <u>CF47 CF44 CF41 CF43 G2016 G2200</u>                |                            | Antenna Distance: <u>3m</u>                     |                       |                                            |                                |                                |      |             |               |
| Configuration: <u>Transmitting into 9 dB Omni-directional Antenna</u> |                            |                                                 |                       |                                            |                                |                                |      |             |               |
| IF Bandwidth: <u>1 MHz</u>                                            |                            | Video Bandwidth: <u>1 MHz</u>                   |                       | Detector: <u>X</u> Peak <u>      </u>      |                                | Quasi Peak <u>      </u>       |      |             |               |
| Ambient Temperature: <u>21</u> C                                      |                            | EUT Power: <u>X</u> 115 V.A.C.                  |                       | <u>X</u> 60 Hz                             |                                | <u>X</u> 1 Phase               |      |             |               |
| Relative Humidity: <u>51</u> %                                        |                            | <u>      </u> 230 V.A.C.                        |                       | <u>      </u> 50 Hz                        |                                | <u>      </u> 3 Phase          |      |             |               |
| Atmospheric Pressure: <u>999</u> mbar                                 |                            | <u>      </u> Other <u>                    </u> |                       |                                            |                                |                                |      |             |               |
| Freq.<br>(MHz)                                                        | Meter<br>Reading<br>(dBuV) | Antenna<br>Factor<br>(dB)                       | Cable<br>Loss<br>(dB) | RF<br>Gain<br>(dB)                         | Corrected<br>Reading<br>(dBuV) | Spec.limit<br>(dBuV)<br>FCC    | Pol. | Comments:   |               |
| 2.4554                                                                |                            |                                                 |                       |                                            |                                |                                |      | Fundamental | Upper Channel |
| 4.9108                                                                | 44.7                       | 30                                              | 7                     | 30                                         | 39.7                           | 54                             | H    | Noise Floor | Upper Channel |
| 7.366                                                                 | 46                         | 34.2                                            | 8.6                   | 34.2                                       | 42.6                           | 54                             | H    | Noise Floor | Upper Channel |
| 9.8216                                                                | 46.2                       | 33.9                                            | 11.5                  | 33.2                                       | 46.4                           | 54                             | H    | Noise Floor | Upper Channel |
| 12.277                                                                | 45.7                       | 33                                              | 12.5                  | 33.5                                       | 45.7                           | 54                             | H    | Noise Floor | Upper Channel |
| 2.4554                                                                |                            |                                                 |                       |                                            |                                |                                |      | Fundamental | Upper Channel |
| 4.9108                                                                | 45.2                       | 30                                              | 7                     | 30                                         | 40.2                           | 54                             | V    | Noise Floor | Upper Channel |
| 7.366                                                                 | 44.7                       | 34.2                                            | 8.6                   | 34.2                                       | 41.3                           | 54                             | V    | Noise Floor | Upper Channel |
| 9.8216                                                                | 46.5                       | 33.9                                            | 11.5                  | 33.2                                       | 46.7                           | 54                             | V    | Noise Floor | Upper Channel |
| 12.277                                                                | 45                         | 33                                              | 12.5                  | 33.5                                       | 45                             | 54                             | V    | Noise Floor | Upper Channel |
| 2.4368                                                                |                            |                                                 |                       |                                            |                                |                                |      | Fundamental | Mid Channel   |
| 4.8922                                                                | 45.7                       | 30                                              | 7                     | 30                                         | 40.7                           | 54                             | V    | Noise Floor | Mid Channel   |
| 7.3476                                                                | 45.5                       | 34.2                                            | 8.6                   | 34.2                                       | 42.1                           | 54                             | V    | Noise Floor | Mid Channel   |
| 9.803                                                                 | 46.3                       | 33.9                                            | 11.5                  | 33.2                                       | 46.5                           | 54                             | V    | Noise Floor | Mid Channel   |
| 12.258                                                                | 45.8                       | 33                                              | 12.5                  | 33.5                                       | 45.8                           | 54                             | V    | Noise Floor | Mid Channel   |
| 2.4368                                                                |                            |                                                 |                       |                                            |                                |                                |      | Fundamental | Mid Channel   |
| 4.8922                                                                | 44.8                       | 30                                              | 7                     | 30                                         | 39.8                           | 54                             | H    | Noise Floor | Mid Channel   |
| 7.3476                                                                | 45.7                       | 34.2                                            | 8.6                   | 34.2                                       | 42.3                           | 54                             | H    | Noise Floor | Mid Channel   |
| 9.803                                                                 | 46.3                       | 33.9                                            | 11.5                  | 33.2                                       | 46.5                           | 54                             | H    | Noise Floor | Mid Channel   |
| 12.258                                                                | 45.7                       | 33                                              | 12.5                  | 33.5                                       | 45.7                           | 54                             | H    | Noise Floor | Mid Channel   |
| 2.417                                                                 |                            |                                                 |                       |                                            |                                |                                |      | Fundamental | Lower Channel |
| 4.8344                                                                | 44.8                       | 30                                              | 7                     | 30                                         | 39.8                           | 54                             | H    | Noise Floor | Lower Channel |
| 7.2516                                                                | 45.2                       | 34.2                                            | 8.6                   | 34.2                                       | 41.8                           | 54                             | H    | Noise Floor | Lower Channel |
| 9.668                                                                 | 45.3                       | 33.9                                            | 11.5                  | 33.2                                       | 45.5                           | 54                             | H    | Noise Floor | Lower Channel |
| 12.086                                                                | 45.8                       | 33                                              | 12.5                  | 33.5                                       | 45.8                           | 54                             | H    | Noise Floor | Lower Channel |
| 2.417                                                                 |                            |                                                 |                       |                                            |                                |                                |      | Fundamental | Lower Channel |
| 4.8344                                                                | 45.8                       | 30                                              | 7                     | 30                                         | 40.8                           | 54                             | V    | Noise Floor | Lower Channel |
| 7.2516                                                                | 45                         | 34.2                                            | 8.6                   | 34.2                                       | 41.6                           | 54                             | V    | Noise Floor | Lower Channel |
| 9.668                                                                 | 45.2                       | 33.9                                            | 11.5                  | 33.2                                       | 45.4                           | 54                             | V    | Noise Floor | Lower Channel |
| 12.086                                                                | 44.8                       | 33                                              | 12.5                  | 33.5                                       | 44.8                           | 54                             | V    | Noise Floor | Lower Channel |

EQUIPMENT: Stratum MPPROJECT NO.: 9L0766RUS2**Spurious Emissions (Radiated)**

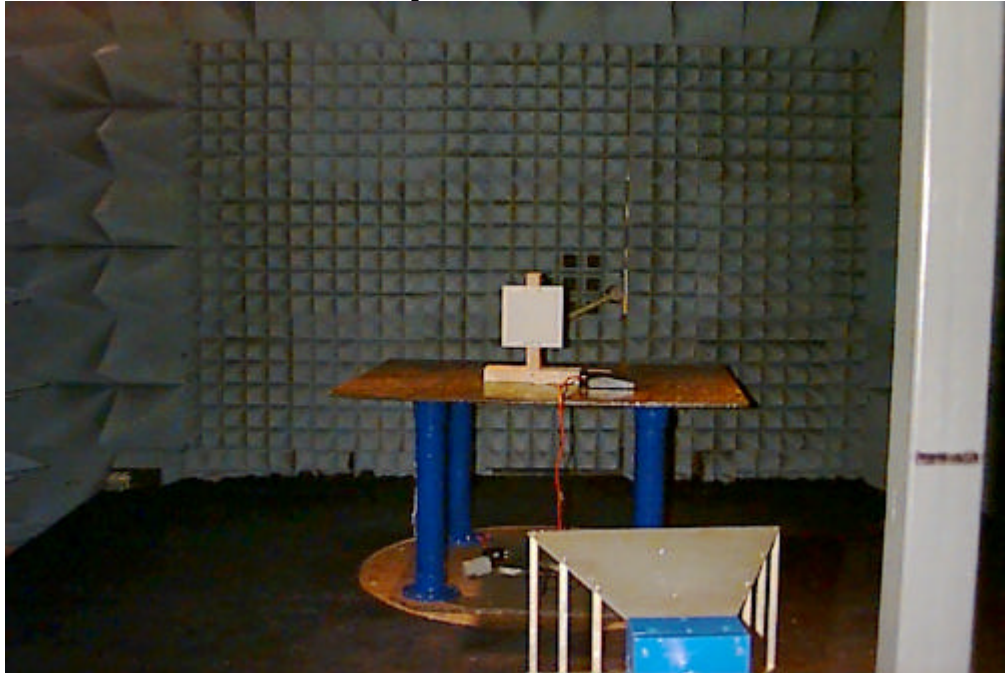
| Radiated Emissions<br>FCC |                                         |  |                               |  |                                          |                             |                                |  |                  |
|---------------------------|-----------------------------------------|--|-------------------------------|--|------------------------------------------|-----------------------------|--------------------------------|--|------------------|
| Complete                  | <u>X</u>                                |  |                               |  |                                          |                             |                                |  |                  |
| Preliminary               |                                         |  | Page <u>1</u> of <u>1</u>     |  |                                          |                             |                                |  |                  |
| Client:                   | <u>Proxim</u>                           |  | W.O.#: <u>9L0766R</u>         |  | Date: <u>May 12 2000</u>                 |                             |                                |  |                  |
| EUT:                      | <u>Stratum MP</u>                       |  | Sample # <u>10</u>            |  | Specification: <u>CFR47, Part 15.247</u> |                             |                                |  |                  |
| Tech:                     | <u>Kevin Rose</u>                       |  | Test #: <u>APSE-4</u>         |  | Lab: <u>AC3</u>                          |                             | Photo ID: <u>9L0766FAPSE-4</u> |  |                  |
| Equipment Used:           | <u>cf47 cf44 cf41 cf43 g2016 g2200</u>  |  |                               |  |                                          | Antenna Distance: <u>3m</u> |                                |  |                  |
| Configuration:            | <u>Transmitting into dipole antenna</u> |  |                               |  |                                          |                             |                                |  |                  |
| IF Bandwidth:             | <u>1 MHz</u>                            |  | Video Bandwidth: <u>1 MHz</u> |  | Detector: <u>X</u> Peak                  |                             | <u>Quasi Peak</u>              |  |                  |
| Ambient Temperature:      | <u>21</u> C                             |  | EUT Power: <u>X</u>           |  | <u>115</u> V.A.C.                        |                             | <u>X</u> 60 Hz                 |  | <u>X</u> 1 Phase |
| Relative Humidity:        | <u>51</u> %                             |  |                               |  | <u>230</u> V.A.C.                        |                             | <u>50</u> Hz                   |  | <u>3</u> Phase   |
| Atmospheric Pressure:     | <u>999</u> mbar                         |  |                               |  | Other                                    |                             |                                |  |                  |

| Freq.<br>(MHz) | Meter<br>Reading<br>(dBuV) | Antenna<br>Factor<br>(dB) | Cable<br>Loss<br>(dB) | RF<br>Gain<br>(dB) | Corrected<br>Reading<br>(dBuV) | Spec.limit<br>(dBuV)<br>FCC | Pol. | Comments:                          |
|----------------|----------------------------|---------------------------|-----------------------|--------------------|--------------------------------|-----------------------------|------|------------------------------------|
| 2.4357         |                            |                           |                       |                    |                                |                             | V    | Fundamental Mid Channel            |
| 4.8714         | 49                         | 30                        | 7                     | 30                 | 56                             | 54                          | V    | Mid Channel                        |
| 4.8714         | 38                         | 30                        | 7                     | 30                 | 45                             | 54                          | V    | VBW reduced to 10 Hz Mid Channel   |
| 7.307          | 46                         | 34.2                      | 8.6                   | 34.2               | 42.6                           | 54                          | V    | Noise Floor Mid Channel            |
| 9.7428         | 46.3                       | 33.9                      | 11.5                  | 33.2               | 46.5                           | 54                          | V    | Noise Floor Mid Channel            |
| 12.1785        | 45.3                       | 33                        | 12.5                  | 33.5               | 45.3                           | 54                          | V    | Noise Floor Mid Channel            |
| 2.4357         |                            |                           |                       |                    |                                |                             |      | Fundamental Mid Channel            |
| 4.8714         | 45.5                       | 30                        | 7                     | 30                 | 40.5                           | 54                          | H    | Noise Floor Mid Channel            |
| 7.307          | 44.5                       | 34.2                      | 8.6                   | 34.2               | 41.1                           | 54                          | H    | Noise Floor Mid Channel            |
| 9.7428         | 46                         | 33.9                      | 11.5                  | 33.2               | 46.2                           | 54                          | H    | Noise Floor Mid Channel            |
| 12.1785        | 45.5                       | 33                        | 12.5                  | 33.5               | 45.5                           | 54                          | H    | Noise Floor Mid Channel            |
| 2.4177         |                            |                           |                       |                    |                                |                             |      | Fundamental Lower Channel          |
| 4.8354         | 44.7                       | 30                        | 7                     | 30                 | 39.7                           | 54                          | H    | Noise Floor Lower Channel          |
| 7.2531         | 44.8                       | 34.2                      | 8.6                   | 34.2               | 41.4                           | 54                          | H    | Noise Floor Lower Channel          |
| 9.67           | 45.5                       | 33.9                      | 11.5                  | 33.2               | 45.7                           | 54                          | H    | Noise Floor Lower Channel          |
| 12.0885        | 44.8                       | 33                        | 12.5                  | 33.5               | 44.8                           | 54                          | H    | Noise Floor Lower Channel          |
| 2.4177         |                            |                           |                       |                    |                                |                             |      | Fundamental Lower Channel          |
| 4.8334         | 49.5                       | 30                        | 7                     | 30                 | 56.5                           | 54                          | V    | Lower Channel                      |
| 4.8334         | 37.3                       | 30                        | 7                     | 30                 | 44.3                           | 54                          | V    | VBW reduced to 10 Hz Lower Channel |
| 7.253          | 44.67                      | 34.2                      | 8.6                   | 34.2               | 41.27                          | 54                          | V    | Noise Floor Lower Channel          |
| 9.6708         | 45.2                       | 33.9                      | 11.5                  | 33.2               | 45.4                           | 54                          | V    | Noise Floor Lower Channel          |
| 12.0885        | 45                         | 33                        | 12.5                  | 33.5               | 45                             | 54                          | V    | Noise Floor Lower Channel          |
| 2.456          |                            |                           |                       |                    |                                |                             |      | Fundamental Upper Channel          |
| 4.9108         | 45.2                       | 30                        | 7                     | 30                 | 40.2                           | 54                          | V    | Noise Floor Upper Channel          |
| 7.366          | 46                         | 34.2                      | 8.6                   | 34.2               | 42.6                           | 54                          | V    | Noise Floor Upper Channel          |
| 9.8216         | 45.5                       | 33.9                      | 11.5                  | 33.2               | 45.7                           | 54                          | V    | Noise Floor Upper Channel          |
| 12.277         | 45.3                       | 33                        | 12.5                  | 33.5               | 45.3                           | 54                          | V    | Noise Floor Upper Channel          |
| 2.4554         |                            |                           |                       |                    |                                |                             |      | Fundamental Upper Channel          |
| 4.9108         | 46.3                       | 30                        | 7                     | 30                 | 41.3                           | 54                          | H    | Noise Floor Upper Channel          |
| 7.3662         | 46.8                       | 34.2                      | 8.6                   | 34.2               | 43.4                           | 54                          | H    | Noise Floor Upper Channel          |
| 9.8216         | 45.3                       | 33.9                      | 11.5                  | 33.2               | 45.5                           | 54                          | H    | Noise Floor Upper Channel          |
| 12.277         | 45                         | 33                        | 12.5                  | 33.5               | 45                             | 54                          | H    | Noise Floor Upper Channel          |

**Radiated Photographs (Worst Case Configuration)**

Flat panel antenna-Front



Flat panel antenna-Rear

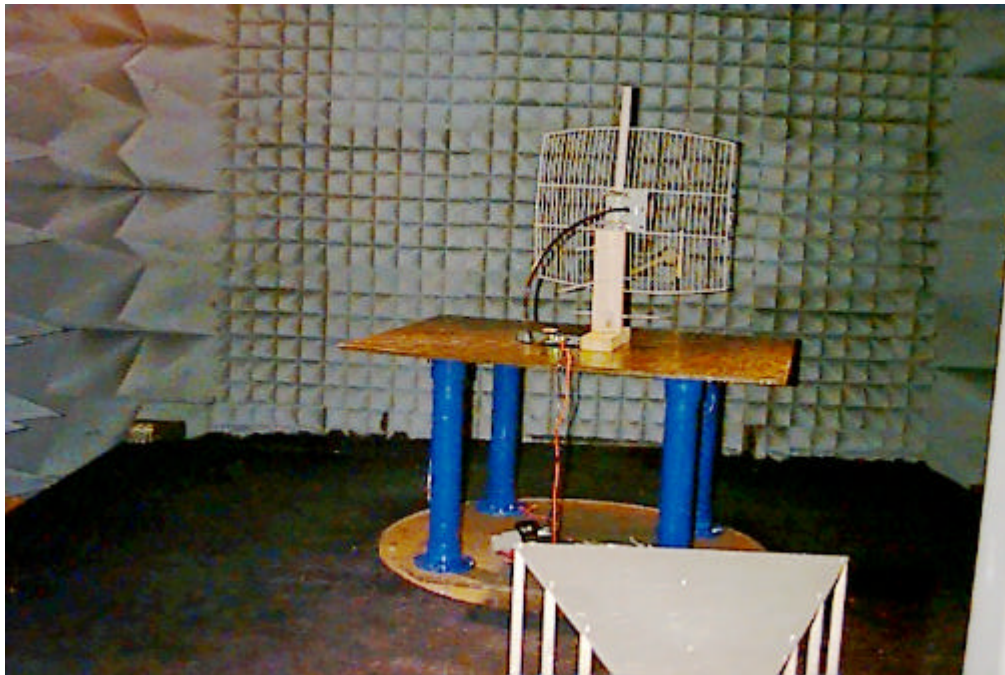


**Radiated Photographs – Continued**

Parabolic Dish Antenna – Front

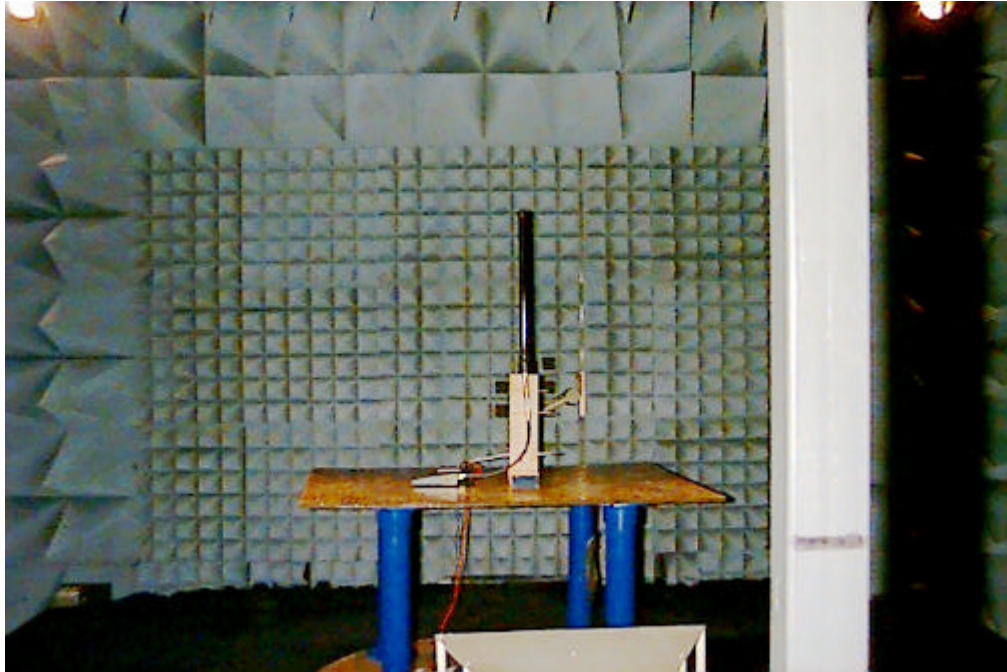


Parabolic Dish Antenna –Rear



**Radiated Photographs – Continued**

Omni-directional Antenna – Front



Omni-directional Antenna –Rear



**Radiated Photographs – Continued**

Dipole Antenna – Front



Dipole Antenna –Rear



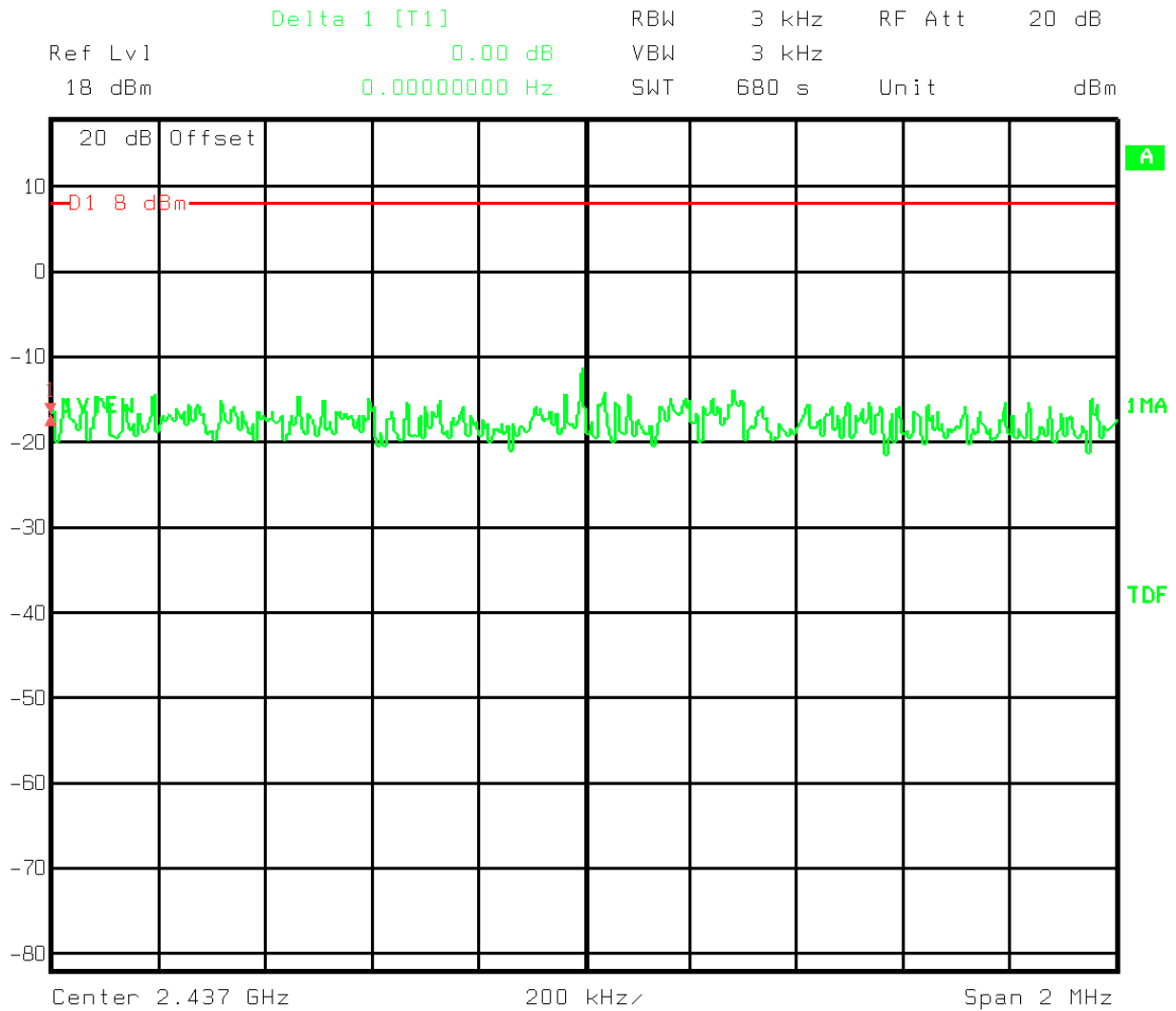
EQUIPMENT: [Stratum MP](#)PROJECT NO.: [9L0766RUS2](#)

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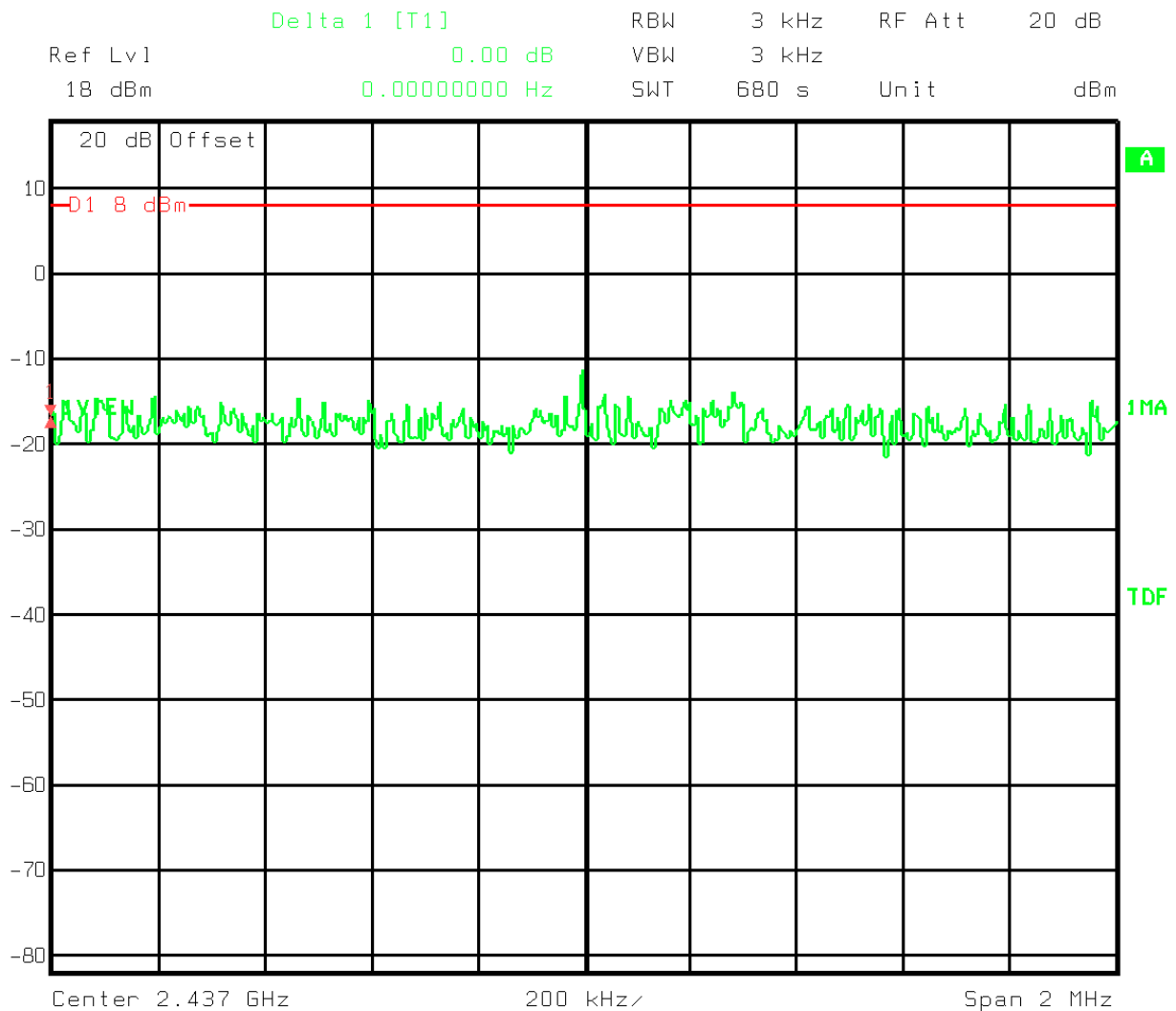
**Section 9. Peak Power Spectral Density**

|                                           |                      |
|-------------------------------------------|----------------------|
| NAME OF TEST: Peak Power Spectral Density | PARA. NO.: 15.247(d) |
| TESTED BY: Kevin Rose                     | DATE: 5/11/00        |

**Test Results:** Complies.**Measurement Data:** See attached plots.**Equipment Used:** [1036](#), [1043](#)**Measurement Uncertainty:** +/- 0.7 dB**Temperature:** 22 °C**Relative Humidity:** 50 %

EQUIPMENT: [Stratum MP](#)PROJECT NO.: [9L0766RUS2](#)**Peak Power Spectral Density – Plots**

Title: spec. power den.upper  
Comment A: proxim  
Date: 11.MAY.2000 15:23:39

EQUIPMENT: [Stratum MP](#)PROJECT NO.: [9L0766RUS2](#)**Peak Power Spectral Density – Plots**

Title: spec. power den.upper  
Comment A: proxim  
Date: 11.MAY.2000 15:23:39

EQUIPMENT: [Stratum MP](#)PROJECT NO.: [9L0766RUS2](#)

## Section 10. Minimum Processing Gain

NAME OF TEST: Minimum Processing Gain

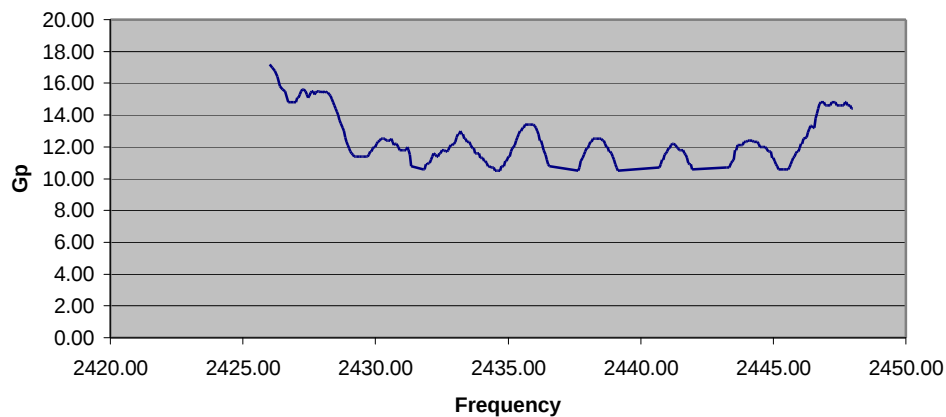
PARA. NO.: 15.247(e)

TESTED BY: [Manufacturer](#)

**Test Results:** [Complies. The processing gain of the system exceeds 10 dB across the entire passband of the system.](#)

**Measurement Data:** [A separate test report has been provided for processing gain. The specific test method and conditions are recorded in that report.](#)

Measured Practical Processing Gain for Stratum MP



**Equipment Used:** [See separate test report](#)

**Section 11. Test Equipment List**

The listing below indicates the test equipment utilized for the test(s).

| KTL ID | Description                      | Manufacturer<br>Model Number                   | Serial<br>Number | Calibration<br>Date |
|--------|----------------------------------|------------------------------------------------|------------------|---------------------|
| 759    | ANTENNA, LOG PERIODIC            | A.H. SYSTEMS<br>SAS-200/510                    | 556              | 01/25/99            |
| 1479   | Bi Conical Antenna 20-330<br>MHz | A. H. Systems<br><br>SAS-200/540               | 496              | 10/19/99            |
| 1036   | SPECTRUM ANALYZER                | ROHDE & SCHWARZ<br>FSEK30                      | 830844/006       | 06/14/99            |
| 791    | PREAMP, 25dB                     | ICC<br>LNA25                                   | 398              | 08/27/99            |
| 1188   | LISN                             | EMCO<br>3825/2                                 | 1214             | 01/00/00            |
| 1331   | CABLE, 8.5m                      | KTL<br>RG223                                   | N/A              | 08/06/99            |
| 674    | LIMITER                          | HP<br>11947A                                   | 3107A02200       | 06/17/99            |
| 1066   | CABLE, 4M                        | STORM<br>PR90-010-144                          | N/A              | 10/15/99            |
| 1067   | Blue cable 4m                    | Storm<br>99-10-002                             | 0                | 01/00/00            |
| 993    | Horn antenna                     | A.H. Systems<br>SAS-200/571                    | 0                | Not Req             |
| 1016   | AMPLIFIER                        | HEWLETT PACKARD<br>8449A                       | 2749A00159       | 06/11/99            |
| 1021   | Power sensor                     | Hewlett Packard<br>A (50 ohm, 0.3 uw-<br>100m) | 2349A45632       | 02/17/00            |
| 1065   | ATTENUATOR                       | NARDA<br>776B-10                               | NONE             | 09/30/99            |
| 1043   | Flexible cable 1m                | Astrolab Inc.<br>32027-2-29094K-1M             | 0                | 01/00/00            |
| 406    | POWER METER                      | HP<br>436A                                     | 2512A22082       | 02/17/00            |

Calibration interval on all items is typically 12 months from the calibration date shown. Where relevant, measuring equipment is subjected to in-service checks between testing. Should any measurement equipment be utilized beyond its scheduled

*EQUIPMENT:* [Stratum MP](#)PROJECT NO.: [9L0766RUS2](#)

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calibration date, the measuring equipment is subjected to in-service checks prior to use. KTL shall notify clients promptly, in writing, of identification of defective measuring equipment that casts doubt on the validity of results given in this report.

**LEGEND:**

|     |                          |
|-----|--------------------------|
| CNR | CALIBRATION NOT REQUIRED |
| N/A | NOT APPLICABLE           |
| CBU | CALIBRATED BEFORE USE    |

## **ANNEX A - TEST DETAILS**

*EQUIPMENT:* [Stratum MP](#)

PROJECT NO.: [9L0766RUS2](#)

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|                                             |                      |
|---------------------------------------------|----------------------|
| NAME OF TEST: Powerline Conducted Emissions | PARA. NO.: 15.207(a) |
|---------------------------------------------|----------------------|

**Minimum Standard:**

The R.F. that is conducted back onto the AC power line on any frequency within the band 0.45 to 30 MHz shall not exceed 250 $\mu$ V (48 dB $\mu$ V) across 50 ohms.

*EQUIPMENT:* [Stratum MP](#)

PROJECT NO.: [9L0766RUS2](#)

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|                                      |                         |
|--------------------------------------|-------------------------|
| NAME OF TEST: Minimum 6 dB bandwidth | PARA. NO.: 15.247(a)(2) |
|--------------------------------------|-------------------------|

**Minimum Standard:**      The minimum 6 dB bandwidth shall be at least 500 kHz

NAME OF TEST: Maximum Peak Output Power

PARA. NO.: 15.247(b)(1)

**Minimum Standard:** The maximum peak output power shall not exceed 1 watt.

If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point to point operation may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceed 6 dBi.

Systems operating in the 5725 – 5850 MHz band that are used exclusively for fixed, point-to-point operation may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter peak output power.

**Direct Measurement Method For Detachable Antennas:**

If the antenna is detachable, a peak power meter is used to measure the power output with the transmitter operating into a 50 ohm load. The dBi gain of the antenna(s) employed shall be reported.

**Calculation Of EIRP For Integral Antenna:**

If the antenna is not detachable from the circuit then the Peak Power Output is derived from the peak radiated field strength of the fundamental emission by using the plane wave relation  $GP/4\pi R^2 = E^2/120\pi$  and proceeding as follows:

$$P = \frac{E^2 R^2}{30G} = \frac{E^2 3^2}{30G}$$

where,

P = the equivalent isotropic radiated power in watts

E = the maximum measured field strength in V/m

R = the measurement range (3 meters)

G = the numeric gain of the transmit antenna in relation to an isotropic radiator

The RBW of the spectrum analyzer shall be set to a value greater than the measured 6 dB occupied bandwidth of the E.U.T.

Number of channels tested:

| Tuning range     | Number of channels tested | Channel location in band |
|------------------|---------------------------|--------------------------|
| 1 MHz or less    | 1                         | middle                   |
| 1 to 10 MHz      | 2                         | top and bottom           |
| more than 10 MHz | 3                         | top, middle, bottom      |

*EQUIPMENT:* [Stratum MP](#)

PROJECT NO.: [9L0766RUS2](#)

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|                           |                         |
|---------------------------|-------------------------|
| NAME OF TEST: RF Exposure | PARA. NO.: 15.247(b)(4) |
|---------------------------|-------------------------|

**Minimum Standard:**

Systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines stipulated in 1.1307(b)(1) of CFR 47.

EQUIPMENT: [Stratum MP](#)PROJECT NO.: [9L0766RUS2](#)

NAME OF TEST: Spurious Emissions(conducted)

PARA. NO.: 15.247(c)

**Minimum Standard:**

In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits. Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

| Frequency (MHz) | Field Strength (mV/m @ 3m) | Field Strength (dB @ 3m) |
|-----------------|----------------------------|--------------------------|
| 30 - 88         | 100                        | 40.0                     |
| 88 - 216        | 150                        | 43.5                     |
| 216 - 960       | 200                        | 46.0                     |
| Above 960       | 500                        | 54.0                     |

**THE SPECTRUM IS SEARCHED TO THE 10th HARMONIC OF THE HIGHEST FREQUENCY GENERATED IN THE EUT.**

**Method Of Measurement:**30 MHz - 10th harmonic plot

RBW: 100 kHz

VBW: 300 kHz

Sweep: Auto

Display line: -20 dBc

Lower Band Edge

RBW: At least 1% of span/div.

VBW: &gt;RBW

Span: As necessary to display any spurious at band edge.

Sweep: Auto

Center Frequency: 902 MHz, 2400 MHz, or 5725 MHz

Marker: Peak of fundamental emission

Marker Δ: Peak of highest spurious level below center frequency.

Upper Band Edge

RBW: At least 1% of span/div.

VBW: &gt;RBW

Span: As necessary to display any spurious at band edge.

Sweep: Auto

Center Frequency: 928 MHz, 2483.5 MHz, or 5850 MHz

Marker: Peak of fundamental emission

Marker Δ: Peak of highest spurious level above center frequency.

Number of channels tested:

| Tuning range     | Number of channels tested | Channel location in band |
|------------------|---------------------------|--------------------------|
| 1 MHz or less    | 1                         | middle                   |
| 1 to 10 MHz      | 2                         | top and bottom           |
| more than 10 MHz | 3                         | top, middle, bottom      |

EQUIPMENT: [Stratum MP](#)PROJECT NO.: [9L0766RUS2](#)

NAME OF TEST: Radiated Spurious Emissions

PARA. NO.: 15.247(c)

**Minimum Standard:** In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits:

**Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:**

| Frequency (MHz) | Field Strength (mV/m @ 3m) | Field Strength (dB @ 3m) |
|-----------------|----------------------------|--------------------------|
| 30 - 88         | 100                        | 40.0                     |
| 88 - 216        | 150                        | 43.5                     |
| 216 - 960       | 200                        | 46.0                     |
| Above 960       | 500                        | 54.0                     |

**THE SPECTRUM WAS SEARCHED TO THE 10th HARMONIC**

#### **15.205 Restricted Bands**

| MHz               | MHz                 | MHz           | GHz         |
|-------------------|---------------------|---------------|-------------|
| 0.09-0.11         | 16.42-16.423        | 399.9-410     | 4.5-5.25    |
| 0.495-0.505       | 16.69475-16.69525   | 608-614       | 5.35-5.46   |
| 2.1735-2.1905     | 16.80425-16.80475   | 960-1240      | 7.25-7.75   |
| 4.125-4.128       | 25.5-25.67          | 1300-1427     | 8.025-8.5   |
| 4.17725-4.17775   | 37.5-38.25          | 1435-1626.5   | 9.0-9.2     |
| 4.20725-4.20775   | 73-74.6             | 1645.5-1646.5 | 9.3-9.5     |
| 6.125-6.218       | 74.8-75.2           | 1660-1710     | 10.6-12.7   |
| 6.26775-6.26825   | 108-121.94          | 1718.8-1722.2 | 13.25-13.4  |
| 6.31175-6.31225   | 123-138             | 2200-2300     | 14.47-14.5  |
| 8.291-8.294       | 149.9-150.05        | 2310-2390     | 15.35-16.2  |
| 8.362-8.366       | 156.52475-156.52525 | 2483.5-2500   | 17.7-21.4   |
| 8.37625-8.38675   | 156.7-156.9         | 2655-2900     | 22.01-23.12 |
| 8.41425-8.41475   | 162.0125-167.17     | 3260-3267     | 23.6-24.0   |
| 12.29-12.293      | 167.72-173.2        | 3332-3339     | 31.2-31.8   |
| 12.51975-12.52025 | 240-285             | 3345.8-3358   | 36.43-36.5  |
| 12.57675-12.57725 | 322-335.4           | 3600-4400     | Above 38.6  |
| 13.36-13.41       | 1718                |               |             |

Number of channels tested:

| Tuning range     | Number of channels tested | Channel location in band |
|------------------|---------------------------|--------------------------|
| 1 MHz or less    | 1                         | middle                   |
| 1 to 10 MHz      | 2                         | top and bottom           |
| more than 10 MHz | 3                         | top, middle, bottom      |

|                                         |                      |
|-----------------------------------------|----------------------|
| NAME OF TEST: Transmitter Power Density | PARA. NO.: 15.247(d) |
|-----------------------------------------|----------------------|

**Minimum Standard:** The transmitted power density averaged over any 1 second interval shall not be greater than +8 dBm in any 3 kHz bandwidth.

**Method Of Measurement:** The spectrum analyzer is set as follows:

RBW: 3 kHz

VBW: >3 kHz

Span: => measured 6 dB bandwidth

Sweep: Span(kHz)/3 (i.e. for a span of 1.5 MHz the sweep rate is  $1500/3 = 500$  sec.

LOG dB/div.: 2 dB

**Note:** For devices with spectrum line spacing  $\leq 3$  kHz, the RBW of the analyzer is reduced until the spectral lines are resolved. The measurement data is normalized to 3 kHz by summing the power of all the individual spectral lines within a 3 kHz band in linear power units.

**For Devices With Integral Antenna:**

For devices with non-detachable antennas, the received field strength is peaked and the spectrum analyzer is set as above. The peak emission level is then measured and converted to a field strength by adding the appropriate antenna factor and cable loss. This field strength is then converted to an equivalent isotropic radiated power using the same method as described for Peak Power output.

Number of channels tested:

| Tuning Range     | Number Of Channels Tested | Channel Location In Band |
|------------------|---------------------------|--------------------------|
| 1 MHz or Less    | 1                         | Middle                   |
| 1 to 10 MHz      | 2                         | Top And Bottom           |
| More Than 10 MHz | 3                         | Top, Middle, Bottom      |

NAME OF TEST: Processing Gain

PARA. NO.: 15.247(e)

**Minimum Standard:** The processing gain shall be at least 10 dB.

**Method Of Measurement:** The CW jamming margin method was used to determine the processing gain. A CW signal generator is stepped across the passband of the receiver in 50 kHz increments. At each point the signal generator level required to obtain the recommended bit error rate is recorded. The jammer to signal ratio (J/S) is then calculated. The worst 20% of the J/S points is discarded. The lowest remaining J/S ratio is used to calculate the processing gain.

### **Calculation Of Processing Gain:**

The processing gain was determined by measuring the jamming margin of the E.U.T. and using the following formula:

$$\text{Jamming Margin} = G_p - (S/N)_{\text{out}} - L_{\text{sys}}$$

For a receiver using non-coherent detection the value  $(S/N)_{\text{out}}$  is calculated using the formula:

$P_e = (1/2)\text{EXP}\{-E/2N_o\}$  where  $P_e$  is the probability of error (minimum Bit Error Rate required for proper operation).

$E/N_o$  is  $(S/N)_{\text{out}}$

for example, for a bit error rate of  $10^{-4}$  a S/N ratio of 12.3 dB is required.

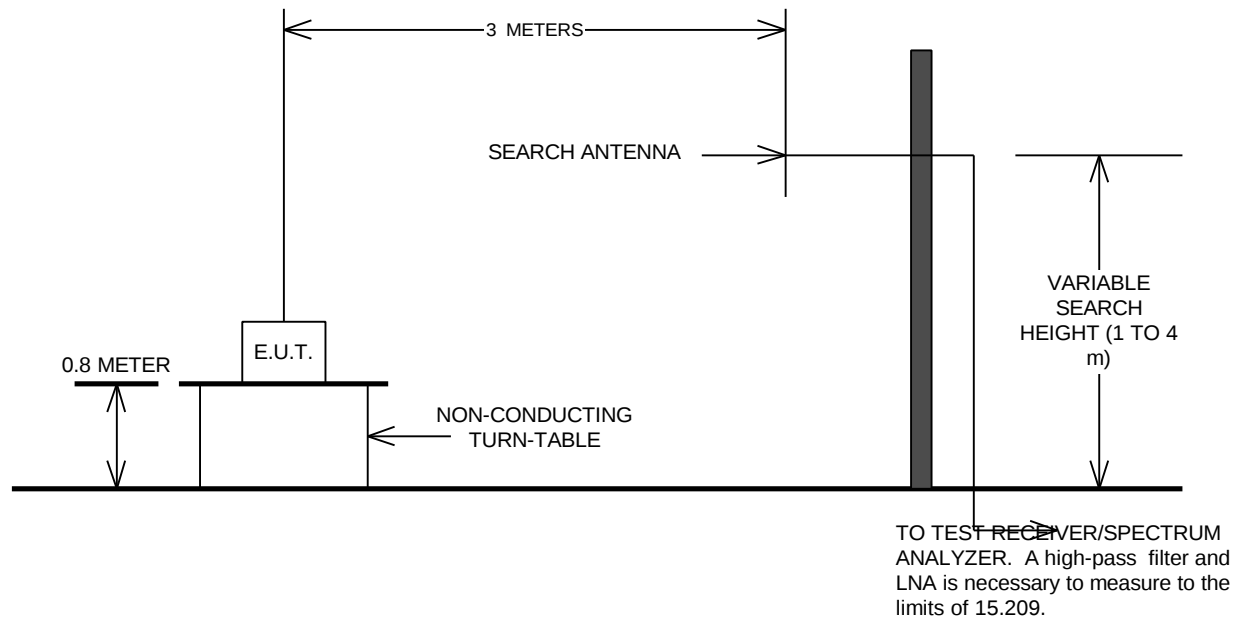
$L_{\text{sys}}$  (system losses) is assumed to be 2 dB.

$$\text{Therefore } G_p = M_j + (S/N)_{\text{out}} + L_{\text{sys}}$$

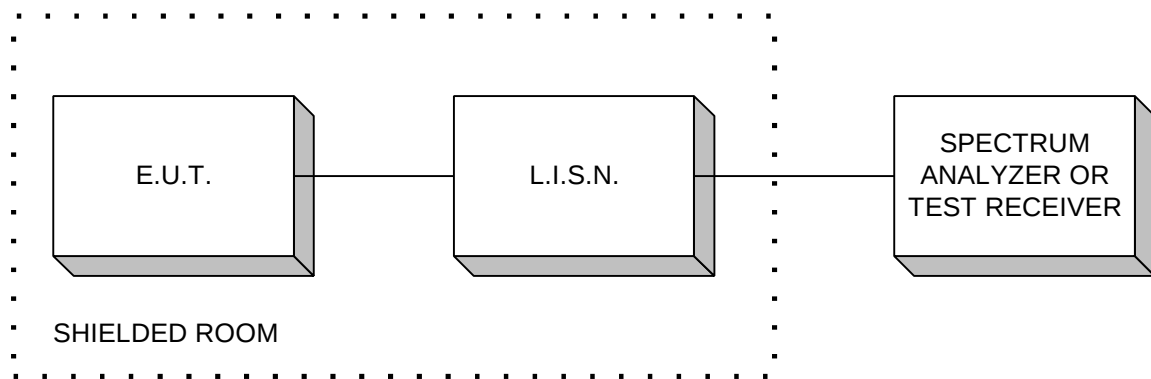
Measurement performed at a channel in the center of the operating band of the EUT.

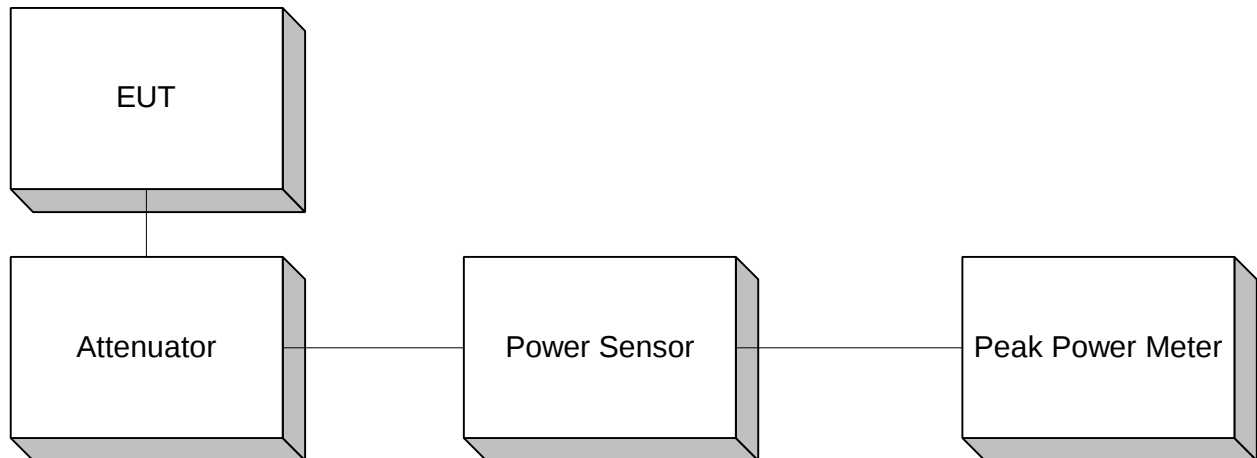
## ANNEX B - TEST DIAGRAMS

## Test Site For Radiated Emissions



## Conducted Emissions



**Peak Power At Antenna Terminals****Minimum 6 dB Bandwidth  
Peak Power Spectral Density  
Spurious Emissions (conducted)****Processing Gain**

[SEE SEPARATE REPORT FOR SETUP DIAGRAM](#)